

**The Network Representation of Control and Raising:
A parallel approach**

Wen-Tzu Lin

Msc Dissertation in English Language

The University of Edinburgh

2005-2006

Abstract

This paper probes a long-standing issue at raising/control distinction in terms of a parallel model. The literature has argued the isomorphism between syntax and semantics. The Principles and Parameters favour the syntactic distinctions, which mirror the semantic ones, whereas Structure Sharing supports a semantic influence. In GB, the PRO Theorem and Control Theory have empirical and theoretical problems. This further drives the development of Minimalism. In Hornstein's movement approach, the track of Minimalism becomes similar to Structure Sharing but retains a syntactocentric representation. A WG model is proposed to give a more thorough explanation in order to show a syntax-semantics mapping. Composed of Dependency Grammar, Lexical Semantics and Cognitive Grammar, the network establishes raising/control models for the data examination. The results demonstrate the semantic distinctions between control and raising, a systematic semantic analysis, and the objection of the PRO formative. The solution of empirical issues resolves the lexical polysemy and implicates that the semantic complexity cannot be detected in the syntactic structure. The further research is suggested to extend the network to complicated data in raising/control and to various linguistic phenomena.

Table of Contents

1 INTRODUCTION	6
1.1 THE EMPIRICAL DIFFERENCES BETWEEN RAISING AND CONTROL	6
1.1.1 Thematic Roles	7
1.1.2 Embedded Passive	8
1.1.3 Selectional Restrictions	8
1.1.4 Pleonastic subject	9
1.1.5 Idiom Chunks	10
1.2 THE EMPIRICAL ISSUES	12
1.3 STRUCTURE OF THE DISSERTATION	14
2 THE THEORETICAL DEBATES	15
2.1 CLASSICAL ANALYSIS VERSUS STRUCTURE SHARING	15
2.2 DEVELOPMENT FROM GB TO MINIMALISM	18
2.2.1 Raising/Control Distinction in GB	18
2.2.2 Raising/Control Distinction in Minimalism	22
2.2.2.1 Null Case Theory	24
2.2.2.2 PRO as Trace	26
2.2.2.3 Thematically-based Approach	28
2.3 DISCUSSION	32
2.3.1 Unsolved Questions	33
2.3.2 A Parallel Treatment	38
3 ALTERNATIVE: NETWORK REPRESENTATION	40
3.1 PARAMETERS OF WORD GRAMMAR MODEL	41
3.1.1 Dependency Grammar	42
3.1.2 Lexical Semantics	43
3.1.3 Cognitive Grammar	45
3.2 CONTROL IN WORD GRAMMAR MODEL	46
3.2.1 Subject Control	47
3.2.2 Object Control	48
3.3 RAISING	52
3.3.1 Subject Raising	52
3.3.2 Object Raising	53
3.4 THE DISTINCTION BETWEEN CONTROL AND RAISING	56

4 TREATMENT OF THE EMPIRICAL DATA	59
4.1 THE TREATMENT OF BEGIN-TYPE PREDICATE.....	60
4.2 THE TREATMENT OF WANT-TYPE PREDICATE.....	61
5 CONCLUSION.....	65
6 BIBLIOGRAPHY	68

Figures

Figure 1: Sentence structure holds challenges	42
Figure 2: Daniel forced John to go to the doctor	45
Figure 3: Subject control	47
Figure 4: Object control.....	48
Figure 5: John _i promises Mary _j to leave _i	50
Figure 6: John _i promises Mary _j to leave _j	51
Figure 7: Mary is promised to leave.....	51
Figure 8: Raising to subject	53
Figure 9: Raising to object.....	54
Figure 10: The street sweeper began to work—subject raising	60
Figure 11: The street sweeper began to work—subject control.....	60
Figure 12: She wanted them to be nice—object raising.....	61
Figure 13: She wanted to be nice—subject control	62
Figure 14: I want there to be fried squid at the reception.....	63
Figure 15: I want the fur to fly at the next week’s meeting.....	63
Figure 16: Terry wants very much for Ashley to arrive on time	64

1 Introduction

This paper firstly introduces the empirical basis for the raising/control distinction. Chapter Two compares GB system with Structure Sharing, which brings out the theoretical question of the isomorphism between syntax and semantics. The remaining section presents the Principles and Parameters (P & P) version of this distinction from GB tradition to Minimalist Program. Like its antecedent, Minimalism follows a syntactocentric track (2.2.2). By criticising the problems in GB (2.2.1) and Null Case Theory (2.2.2.1), Hornstein (1999, 2003) improves his data set and adopts the MP assumptions (2.2.2.2). However, these structural approaches all fail to present the semantic complexity in theoretical grounds.

A crucial argument comes from Culicover and Jackendoff (2001)'s thematically-based approach (Section 2.2.2.3). They conclude that the selection of controller is determined by Lexical Semantics. Through the theoretical comparison, the requests for a parallel approach and for a systematic lexico-semantic analysis are proposed in Section 2.3. The remaining chapter presents an alternative via WG model, which consists of three parameters: Dependency Grammar, Lexical Semantics and Cognitive Grammar. The WG model successfully unpacks the structures of obligatory control and of raising. The results show that semantics distinguishes the subtype of control and that raising is a mismatch between syntax and semantics (3.2, 3.3). These basic representations support the assumptions presented in Section 3.1 and establish different models for data accommodation. Chapter Four further applies these models to the empirical difficulties in Section 1.2 and accounts for the polysemy of a verb which affect its syntactic representations. The network representation is able to capture the syntax-semantics mapping and resolve the empirical and theoretical problems.

1.1 The Empirical Differences between Raising and Control

This section will present the differences between control and raising predicates in this section. It begins by expressing their empirical differences and latter reviews the theories which account for them, from Government and Binding (GB) system to Minimalist Program (MP).

The raising/control distinction is formed by the different classes of matrix verbs with a non-finite complement. This non-finite complement selects its subject among the arguments of the predicates. The example in (1) shows the raising/control distinction of the intransitive verbs. Example (2) is with transitive verbs.

- | | |
|--|-----------|
| (1) a. Daniel expected to leave early. | [control] |
| b. Daniel seemed to leave early. | [raising] |
| (2) a. Jane persuaded Peter to go. | [control] |
| b. Jane expected Peter to go. | [raising] |

(1) and (2) indicate their thematic relations: two semantic arguments with control predicates in (1a) and (2a) for each syntactic arguments of the matrix verb, while one less semantic argument with raising predicates in (1b) and (2b) for each syntactic arguments of the matrix verb.

The theoretical issue is: how can this distinction be represented? Should it be resolved based on syntactocentrism or thematic relation¹? Or should they be parallel in case of control and be mismatched in case of raising?

1.1.1 Thematic Roles

The structure in (3) is known as a control predicate and (4) is raising. Despite the surface similarities in (3a) and (4a), a number of studies have found that there are some underlying differences between control and raising (Bresnan 1982; Hudson 1984, 1990, 2003, 2005; Chomsky 1986, 1995; Chomsky and Lasnik, 1993; Radford 1997; Hornstein 1999, 2003; Davies and Dubinsky 2004). In (3b), the subject *John* bears two theta roles, expector and winner. The subject in (4b) only has one theta role, winner, assigned by the raising predicate *seem* (Hornstein 1999).

- (3) a. John expects to win.

¹ This question comes from the issues at the treatment of control. From the perspective of the syntactocentric approach, control distinction can be largely reflected in the syntactic structure (Boeckx and Hornstein 2003; Davies and Dubinsky 2004). In the other aspects, some studies support that control can be resolved in terms of thematic relation (Bresnan 1982; Culicover and Jackendoff 2001). The two distinct work will be presented in Section 2.2.2.2 and 2.2.2.3

- b. John_i expects [PRO_i to win].
- (4) a. John seemed to win.
- b. John_i seemed [t_i to win]

From the thematic role data above, the instances (5)-(8) demonstrate related consequence between control and raising under different constructions in the case of embedded passivization, selection restrictions on the embedded verbs, pleonastic subjects, and idiomatic expressions (Davies and Dubinsky 2004: 333-34).

1.1.2 Embedded Passive

In the passivisation, the raising predicate in (5a) shows a voice transparency that the passive sentence is synonymous with the active counterpart. According to the Standard Theory assumption, the two synonymous sentences have the same Deep Structure². On the other hand, the control predicate in (6b) does not show this voice transparency: (6b) has different Deep structures between active and passive voice (Davies and Dubinsky 2004).

- (5) a. Barnett believed Tilman to have been examined by the doctor.
- b. Barnett believed the doctor to have examined Tilman.
- (6) a. Barnett persuaded the doctor to be examined by the doctor.
- b. Barnett persuaded the doctor to examine Tilman.

1.1.3 Selectional Restrictions

The selection restriction of the embedded predicate is one of the important distinctions between raising and control. The embedded verb *be granite* in the raising (7a) puts a constraint on the raising subject *the rock*. The raising NP *the rock* is an inanimate entity so it cannot perform an action of understanding. The instance in (7b) is therefore unacceptable. On the contrary, the selection

²D-structure encodes the lexical items of the sentence. It shows the basic argument relations in the sentence, i.e. External arguments are base-generated in the subject position in terms of their predicate; the predicate in the base-position governs the internal arguments (Haegeman 1994:304-05). D-structure undergoes movement transformations to present the S-structure, a level which presents the superficial structure of the sentence like word ordering and case forms. Rosenbaum (1967) and Postal exemplified that Deep Structure is the level in which semantic representation is constructed. Thus, the active and passive structures in (5a) have an identical Deep Structure.

restriction of the embedded verb is absent in control. Like (7c) and (7d), only the matrix verb *persuade* can project selection restrictions on its subject and object. This means that the subject of the verb *persuade* is able to perform the action of persuasion and that the object is able to perceive the action denoted by the verb. The NP *the rock* in (7c) and (7d) is not capable of carrying out the action. This violation follows the semantically ill forms in (7c) and (7d). Thus, this fact shows that raising predicates can be distinguished from control predicates, in terms of whether the embedded verbs can determine the semantic well-formed structure of the sentence (Davies and Dubinsky 2004: 7).

- (7) a. Barnett believed the rock to be granite.
 b. #Barnett believed the rock to understand the issues of the day.
 c. #Barnett persuaded the rock to be granite.
 d. #Barnett persuaded the rock to understand the issues of the day.

1.1.4 Pleonastic subject

The availability of the pleonastic subject helps to distinguish raising from control. Regarding the observation in (4), the raising verb in (8a, b, e, f) only assigns one theta role on either subject in (8e) and (8f) or object argument in (8a) and (8b). The control verb in (8 c, d, g, h) assigns two theta roles on both subject and object arguments. A further diagnosis is to see whether the verbs allow a non-thematic NP on the subject or object position, like the meteorological expression *it* and existential *there* (Chomsky 1986; Hornstein 1999, 2003; Davies and Dubinsky 2004).

The verb *seem* in (8a) and (8b) allows the expletives to be the subject. This indicates that the verb *seem* only have one argument for the nonfinite complement rather than the subject position. The expletive NPs *it* and *there* in (8a) and (8b) move from the specifier position of the infinitive VP to the specifier position of the lower IP and further to the specifier position of the higher IP. The verb *seem* is therefore diagnosed as a subject raising predicate. On the contrary, the verb *try* in (8c) and (8d) have two theta assignments due to the prohibition of the expletive subject. This means that the expletive subject

cannot sanction the matrix verb *try*. The behaviour of the verb *try* is therefore distinctive from the behaviour of the raising verb.

- (8) a. It seemed to be raining.
b. There seems to be a unicorn in the garden.
c. *It tried to be a unicorn in the garden.
d. *There tried to be a unicorn in the garden.

Likewise, the verbs *believe* and *persuade* are inserted an expletive object in (8e-h). The verb *believe* in (8e) and (8f) only assigns a θ -role on the subject because the object is a semantically null NP. Different from the subject raising, this null NP raises from the specifier position of the infinitive VP to the specifier position of the lower IP. The verb *believe* is therefore diagnosed as a predicate of raising to object. On the other hand, the verb *persuade* disallows the expletive *there* on the object position like (8g) and (8h); the expletive object cannot sanction the matrix verb *persuade*. The behaviour of the verb *persuade* is thus distinctive from the behaviour of the verb *believe*. The evidence in (8) shows that the appearance of the expletive arguments tells us how many θ -positions a verb has assigned and where the θ -positions are. In addition, the semantic differences of how different verbs associates with the subjacent arguments are exhibited by putting in a semantically null argument like *it* and *there*.

- (8) e. Barnett believed it to have rained.
f. Barnett believed there to be a unicorn in the garden.
g. *Barnett persuaded it to rain.
h. *Barnett persuaded there to be a unicorn in the garden.

1.1.5 Idiom Chunks

The final distinction between raising and control is distinguished by whether the idiomatic meanings can be preserved in the predication or not. Despite the literal interpretation, the sentence in (9) embodies a special meaning that a secret is no longer kept. The NP *the cat* implies the secret. This implication of *the cat* makes us regard the whole sentence as a fixed expression. The idiomatic expression thus shows in a specific structure, known as idioms, as seen in (9).

(9) The cat is out of the bag.

The idiomatic meaning is preserved in raising (10a) and (10c) because the meaning does not change in its raising construction. Thus, the interpretation in (10a) and (10c) retain its special expressions in raising. Alternatively, the idiomatic meaning disappears in control (10b) and (10d) because *the cat* in these structures loses its special expression like (9). In (10b) and (10d), the NP *the cat* only refers to the animal, rather than the secret. (10a) and (10c) still have the idiomatic expression, although the NP *the cat* is separated from the original structure in (9). This means that the NP *the cat* in (10a) and (10c) refers to the secret. The construction in (10a) and (10c) is thus identified as idiom chunk, in which a part of the constituent separates from the original idiomatic structure but still possesses the special expression.

(10)a. The cat seemed to be out of the bag.

b. ?The cat tried to be out of the bag.

c. Tina believed the cat to be out of the bag by now.

d. ?Tina persuaded the cat to be out of the bag.

The next section describes two empirical difficulties due to the separation of the raising/control data: *begin*-type and *want*-type verbs. Verbs like *begin* can appear in both raising and control. Verbs like *prefer* and *like* have certain portions of properties in raising as well as in control. It further blurs the boundary between raising and control. The empirical exceptions raise the problems of how we distinguish the control and raising predicates. The fundamental factor of these difficulties is because of the number of the theta-marked arguments assigned by the predicates. Therefore, it appears that the behaviour of the verb deserves a further exploration, which is shown in Chapter Four.

1.2 The Empirical Issues

There are two major issues in the empirical evidence. The first complication is verbs that can appear in both control and raising constructions such as *begin* (Perlmutter 1970).

The instance in (11) has two readings in (12a, b). According to the interpretation in (12a), the verb *begin* is an aspectual raising verb; thus there is no argument assigned to the machine *the street sweeper* by *begin*. The subject of the main clause in (12b) denotes a person which is assigned by the verb *begin*. The verb *begin* is a control predicate in the interpretation (12b). Some other verbs like *promise* and *threaten* exhibit this characteristics as well.

(11) The street sweeper began to work.

(12)a. The street sweeper began to work, once we replaced the spark plugs.

b. The street sweeper began to work, as soon as he got to the park.

The second complication is that it is difficult to distinguish between the two constructions; thus their generalizations cannot cover these unspecified verbs (Ruwet 1991). Thus, it evokes the possibility of a third class like *want*, *prefer*, *hate*, *intend*, *like*, *mean*, and so forth. The class of verbs can occur in both raising and control but only show part of these characteristics in raising and control. The example in (13a) exhibits a raising construction whereas (13b) exhibits a control construction. Next, the patterns in (14) show similar pattern with the raising verb *believe*, because (14a) has a post-verbal expletive *there* and the idiom preserves the idiomatic meaning in (14). The fact in (14) indicates that there is a trace in the matrix object position.

(13)a. She wanted them to be nice

b. She wanted to be nice.

(14)a. I want there to be fried squid at the reception.

b. I want the fur to fly at next week's meeting.

(15a) rules out the pleonastic subject and (15b) excludes the idiomatic interpretation. The fact is that (16) exhibits the characteristic of *want* verbs to distinguish themselves from other verbs. This distinctive character is that it can occur with a complementizer *for*. The examples in (17) show that the characteristic of *want* verbs in (16) is absent in pure raising predicates or in pure control predicates (Davies and Dubinsky 2004: 14-15).

- (15)a. *There wants to be fried squid at the reception.
- b. *There fur wants to fly.
- (16)a. Terry wants very much for Ashley to arrive on time.
- b. The administration would prefer for all professional staff to agree to a furlough.
- (17)a. *Barnett believes (very much) for the doctor to have examined Tilman.
- b. *Barnett persuaded (very strongly) for the doctor to examine Tilman.

From the observation (Section 1.1.1-1.1.5), the empirical differences exemplified in (3-9) are summarised below (Davies and Dubinsky 2004: 333-34):

- Control NP has two thematic roles whereas raising NP has one.
- Voice transparency: Raising shows a active/passive synonymy but control does not.
- Raising structures reflect selection restrictions of embedded class while control structures do not.
- Pleonastic subject is possible with raising but not with control.
- The raised NP of the raising predicate can preserve the idiomatic meaning, while the NP of the control predicate cannot.

These empirical distinctions in the evidence above propose the syntactic and semantic differences between raising and control. More importantly, these distinctions are hardly defined as a pure syntactic or semantic factor. For instance, control predicates can be distinguished from raising predicates by how many semantic arguments a verb can possess. As seen in (4), the raising

predicate is only associated with one semantic argument. Therefore, in the surface structure (SS), the subject in (3) thus appears by syntactic operation: move NP from the verb's semantic argument.

Voice transparency in (5) involves whether the meaning changes in syntactic transformation. The selection restrictions of embedded class use semantic constraints to determine whether the embedded verb can assign an NP in the syntactic structure. The test of pleonastic subject in (8) is to put a semantic null element in a required syntactic position and see if the expletive subjects are allowed to appear in the structure. The test of idiom chunk in (9) is to separate a portion of the constituent from the idiomatic structure for the purpose of whether the constituent can preserve its special expression in a new structure. These distinctions all reveal that: the number of arguments in the semantics affects the representation of their syntactic structures. Regarding the empirical evidence, the distinctions between raising and control belongs to an interface between syntax and semantics.

The two complications result in more problems when scholars attempt to give a plausible account. The verbs like *begin* raise an ambiguity in the interpretation. This empirical fact brings about the difficulty in the classification of the predicates. Meanwhile, the verbs in (13-17) are suggested to form a third class. Another problem is that to what extent a third-class verb can behave as a raising predicate or as a control predicate. Some additional characteristics like (16) remain unexplained. These empirical facts increase the difficulty in the separation of predicates and the structure they belongs to. Therefore, a sufficient treatment should take all the empirical facts into consideration (Davies and Dubinsky 2004).

1.3 Structure of the Dissertation

This paper will be organised in the following way. It will firstly present the empirical data in raising/control distinction. These data all refers to a semantic distinctions shown in the related structures: thematic roles, embedded passive, selectional restrictions, pleonastic subject, and idiom chunks. The theoretical question is: do these semantic differences show in syntax or not? The next

chapter will survey the literature which argues that the semantic differences need to be represented in the syntax (Chomsky 1986) and an influential paper by Culicover and Jackendoff (2001) who argue that syntax and semantics are mismatched, following Bresnan (1982). Chapter Three presents an alternative—WG model—to present a structure sharing structure in raising/control distinction. The remaining section presents how the raising/control model is established. Chapter Four further suggests the possible solution for the empirical issues and obtains preliminary findings.

2 The Theoretical Debates

This Chapter presents a number of theoretical debates from GB to Minimalism. In traditional analysis—Government and Binding system, it treated control as a phonetically unrealised word in the subject position of the non-finite clause, whereas raising is a movement. Under Minimalism (Chomsky 1995), there are several analyses for the treatment of OC from various perspectives. One is Chomsky and Lasnik's (1993) work where this implicit subject is assigned a Null Case to satisfy the theta-criterion. Hornstein (1999, 2003) proposes that control is a specific kind of raising and thus combine the OC and raising. A recent study proposed by Culicover and Jackendoff (2001) suggests the treatment of OC in terms of thematic relations. These approaches evoke the need of a parallel alternative to justify whether raising/control distinction can be represented at the level of syntax or semantics.

2.1 Classical Analysis versus Structure Sharing

This section compares two different analyses in raising/control distinction. One is the Government and Binding Tradition with a syntactocentric account (Chomsky 1986). The other is Structure Sharing, which regards the raising/control distinction as semantics (Bresnan 1982; Hudson 1984, 1990; Dalrymple 1999). To see the difference of the two frameworks, this research will present their analysis in the examples of (18) and (19). We foreground the distinctions between GB and Structure sharing in raising/control and briefly present the analysis under the two frameworks.

- The first distinction is the data separation; GB separates raising and control, whereas LFG combines the obligatory control and raising, as shown in (18) and (19).
- The second distinction is how GB and LFG treat raising and control. GB treats control by inserting a phonetically-null word PRO, like in (20) and raising by movement in (21); LFG treats OC and raising as structure sharing.
- The third distinction is how GB and Structure sharing determine the number of the arguments of the predicate. It is determined by theta assignment in GB and by grammatical relation in LFG.

(18) We persuaded Paul to be nice. [control]

(19) We believed Paul to be nice. [raising]

Under GB tradition, the deep structures of the examples (18) and (19) are presented respectively in (20) and (21). According to θ -criterion, *Paul* is assigned a θ -role by the control predicate *persuade* in (20). In order to satisfy θ -criterion, PRO is posited into the Spec IP as the subject of the non-finite clause. This PRO refers to the local antecedent *Paul* and is interpreted as an anaphor. As in (21), *Paul* does not receive a θ -role in the position of matrix object because the verb *believe* is a one-place predicate. *Paul* moves from the subject of the non-finite clause and it leaves a trace.

(20) We persuaded Paul [PRO to be nice]

(21) We believed Paul [*t* to be nice]

Under a Structure Sharing analysis, as proposed in Bresnan's (1982) Lexical Functional Grammar (LFG), control in (20) and raising in (21) are collapsed together. Bresnan (1982) assumes that (20) and (21) are syntactically identical, as presented in (22) and (23). The only distinction is that the control predicate *persuade* has one extra semantic role in a-structure (ibid: 101-102). This supports that raising and control are semantically distinct. Bresnan replaces c-command with f-command. She rejects empty categories in GB, such as PRO and trace, and further suggests a structure sharing in control. (22) and (23) are a

sharing structure between the object of the matrix clause and the subject of the infinitive.

(22)a. We persuaded Paul to be nice.

b. c-structure: [_S we [_{VP} persuaded [_{NP} Paul] [_{VP} to be nice]]]

a-structure: persuade < (we)_{EXP} (**Paul**)_{GOAL} (Paul be nice)_{THEME}>be-nice <(Paul)_{THEME}>

f-structure: PREDICATE= believe

SUBJECT= we

OBJECT= Paul

COMPLEMENT= [PREDICATE=be nice]

SUBJECT=



(23)a. We believed Paul to be nice.

b. c-structure: [_S we [_{VP} believed [_{NP} Paul [_{VP} to be nice]]]

a-structure: believe < (we)_{EXP} (Paul be nice)_{THEME}>

be-nice <(Paul)_{THEME}>

f-structure: PREDICATE= believe

SUBJECT= we

OBJECT= Paul

COMPLEMENT= [PREDICATE= be nice]

SUBJECT=



In LFG, the subject argument is regarded as an external argument, not a θ -role. The similarity between the raising predicate and the control predicate is that their subject argument is required, which is in contrast to GB analysis. LFG determines the argument relations of a verb in terms of the grammatical argument rather than theta-assignment.

The data separation presents one of the issues: how we treat control when control is divided into different subclasses? In LFG, the analysis shows that the syntax and semantics are not parallel in the raising/control distinction. This raises another question: are syntax and semantics isomorphic in the architecture of the grammar? The first question will be further explored in 2.2. Supporting

the semantic distinction in raising/control, Chapter Three propose a WG model to answer the second question.

2.2 Development from GB to Minimalism

This section highlights the parameter settings from GB to Minimalism, in particular the treatment in control. There are several reasons to look at the issues of control. The first reason is that in GB, the analysis is fine in raising but problematic in control. The issues in PRO Theorem and Control Theory increase the difficulty in classifying the subclasses of control (see 2.2.1). The second reason is that it is not clear whether raising and control data should be unified or divided in GB. Minimalist Program (MP) seeks simplicity and naturalness of the language in terms of economy and full interpretation conditions by feature-checking at Spell-Out (2.2.2). Two of the major work in this area are Chomsky and Lasnik's (1993) Null Case Theory (2.2.2.1) and Hornstein's (1999, 2003) Movement Approach (see 2.2.2.2). One adds Null Case to PRO as features in the tense position of non-finite control. The other adopts basic MP assumptions to give a syntactocentric analysis of OC. These syntactic theories reflect the theoretical questions at the end of Section 2.1 and drive a parallel alternative in order to explore the influence of syntax/semantics in raising/control in the following chapter.

2.2.1 Raising/Control Distinction in GB

The first related raising/control distinction in GB dates back to Chomsky's (1965: 20-1) classic examples, using *expect* and *persuade*. Chomsky (1986) proposes that the empty category in raising is a trace while in control it is PRO. Each is stipulated by different assumptions and represented different properties. In order to explain their theoretical distinctions, a number of questions are raised here:

- What is a trace?
- What is PRO?
- What is the distribution of PRO?
- How does the grammar of PRO intersect with these?

Firstly, a trace is a member of empty category; it indicates the position where the raised NP stays before it moves. The distribution of Raising is based on the theoretical assumptions: Empty Category Principle, Projection Principle, θ -theory, and Subjacency Condition³. These assumptions indicate the distribution and the properties of the trace:

- (i) Trace must be properly governed⁴.
- (ii) The antecedent of trace is **not** in a θ -position.
- (iii) The antecedent-trace relation satisfies the Subjacency Condition.
- (iv) Trace is not the head of the chain.

These assumptions are instantiated in (4). The trace t_i in (4b) is governed by NP *John*; this trace is c-commanded by *John*. The verb *seem* is a one-place predicate, which only assigns a theta argument to its non-finite argument. The antecedent *John* is not in a θ -position. It follows the Projection Principle that *John* moves to the subject position from the lower Spec IP due to the requirement of the sentential subject. Under the Subjacency Condition, *John* does not move across its NP and S. Last, a trace left in the lower Spec IP does not lead the head of the chain⁵. The fact is that the raising in (4) is treated by movement; the subject of the non-finite clause moves to the matrix subject position and leaves a trace, which indicates its position in Deep Structures (DS).

Secondly, PRO is also a member of empty category; it indicates a syntactic word which is phonetically null and is absent in the S-structure. The theoretical assumptions in control and the properties of PRO are: θ -theory, Equi NP deletion, Control Theory⁶, Binding theory, Case-theory, PRO Theorem⁷.

³ This is the requirement of Bounding Theory (Chomsky 1973); a single movement is not allowed to cross more than one bounding node. This bounding node in English can be NP and S (NP and S-bar in some cases). This condition combines some of Ross's island constraints.

⁴ Recalling the definition of government by Chomsky (1986: 250), this governing relation is based on three conditions: (i) the lexical category A coindexes with another lexical category B, (ii) where J is a maximal projection and J dominate both A and B and (iii) A c-commands B. In this case, A governs B: A is the governor of B.

⁵ A chain is a set of syntactic components under specific conditions. The leading element of the chain is called the head of the chain. For instance, An A-chain like $[a^1, a^2, a^3, \dots, a^n]$ is where the head of the chain (a^1) occupies the A-position and a^n is the foot of the chain. Theta-role can determine the property of the chain. In (3b), *John* is the head which lead the PRO in the chain. However, in (4b), *John* cannot lead a chain without taking a theta position.

⁶ The theory of control accounts for the referential element in control: the implicit subject of the nonfinite clause refers to an appropriate antecedent (Chomsky 1986: 56). The implicit subject in

These assumptions provide different theoretical grounds for control. In (3b), the subject has two θ -roles: one is the agent assigned by the matrix verb *expect* and the other is the experiencer assigned by the verb *win* of the non-finite clause. According to the θ -criterion, one argument can only bear one θ -role. The subject *John* cannot bear the agent role as well as the role of experiencer. This syntactic word PRO supports the implicit subject of the non-finite clause and satisfies θ -criterion. PRO carries a theta role so that it helps to account for the θ -criterion. PRO is regarded as a deletion of the non-finite subject which is equivalent to the matrix subject.

Thirdly, a number of limits exist in the distribution of PRO. From the semantic arguments related to the syntax, PRO occupies the subject position in the non-finite clause like (3b). According to PRO Theorem, the position of PRO in (3b) is ungoverned, with the further inference that PRO is not case-marked. PRO in (3b) refers to the matrix subject *John* to illustrate the binding relations.

As Williams (1980) noticed, apart from the obligatory control shown in (3), PRO can refer to an arbitrary reference. Hornstein (1999, 2003) distinguishes this as non-obligatory control (NOC), with the example in (3) being an obligatory control (OC). In non-obligatory control (NOC), PRO does not refer to a proper antecedent and it can be replaced by a pronominal (Hornstein 1999, 2003). Like in (24a), PRO does not have an antecedent and it is interpreted as a pronoun *he* in (24b). Combining the diagnoses above, PRO is simultaneously regarded as an anaphor in OC and a pronominal in NOC.

(24)a. Only Churchill remembers PRO giving the BST speech.

b. Only Churchill remembers that he gave the BST speech.

From the observation above, the properties of PRO are:

- (i) PRO refers to its bounded antecedent or arbitrary reference.
- (ii) PRO must be ungoverned and PRO is not case-marked.

(3b) clearly refers to the antecedent *John*. The antecedent of PRO (24) is an arbitrary PRO, which can be replaced by a pronoun (Hornstein 1999).

⁷ According to PRO Theorem, PRO is in the ungoverned position.

- (iii) The antecedent of PRO is in a θ -position.
- (iv) The antecedent-PRO relation may **not** satisfy the Subjacency Condition.
- (v) PRO is the head of the chain.

Lastly, these properties should help the grammar of PRO: in relation to where PRO is distributed and how it is interpreted at the level of syntax. However, the PRO Theorem and Control Theory cannot rule out the empirical exceptions and make the status of PRO ambiguous, which is shown in the following.

PRO Theorem, in terms of government, cannot exclude the examples like (25b) (Chomsky and Lasnik 1993). In order not to violate PRO Theorem, PRO in (25a) raises from an object position of embedded VP to the specifier position of lower IP. This raises the question why the sentence in (25b) is unacceptable, since PRO is ungoverned. Thus, PRO Theorem is insufficient for explaining the distribution of PRO.

- (25)a. We never expected [PRO_i to be found t_i].
- b. *We never expected [PRO_i to appear to t_i [that Sally left]].

Regarding the observation above, the status of PRO is ambiguous and is not distinguished between OC and NOC (Hornstein 1999, 2003). This is further against the existence of PRO Theorem being reduced from Binding Theory. In Section 2.1.1.1, PRO is anaphoric in OC and pronominal in NOC. This result is inconsistent with PRO Theorem, which claims that PRO is a pronominal anaphor.

Control Theory is not satisfactory for the reason of the implicit interpretation of PRO in GB analysis (Hornstein 1999, 2003). Control Theory accounts for the selection of the reference depending on its syntactic structure (ibid). In fact, it does not provide a simple and agreed upon explanation for its distribution or interpretation. Regarding the discussion in 2.1.1.1, PRO has an anaphoric expression in OC configurations and a pronominal expression in NOC configurations. This means that there are dual standards in the configuration of

PRO, which cannot be differentiated by Control Theory. This dual status suggests that the control module, in terms of government, cannot offer a precise account for where PRO may occur and for how PRO is interpreted.

From the discussion above, these criticisms point out the insufficiency and inconsistency of the PRO Theorem and of Control Theory in GB. Thus, in the following alternatives, the PRO formative in GB is added with a null case or replaced by a trace in MP.

In GB analysis, raising is treated via movement and control is treated via positing a syntactic word PRO. This indicates that GB attempts to resolve raising/control distinction at the level of syntax, which is not supported because of the criticisms of the PRO Theorem and Control Theory. The consequence is that these problems result in ambiguous configurations, which suggests the inadequacy of PRO Theorem. These criticisms presented later challenge the existence of PRO and facilitate the development of the Minimalism.

2.2.2 Raising/Control Distinction in Minimalism

In Minimalism, Chomsky (1995) incorporates some new simple and natural assumptions of language while retaining some parameter settings from GB⁸. Like its antecedent, Minimalism resolves raising/control in the dimension of syntax and considers that semantic factors are hidden in the syntactic structures. Four major assumptions related to the raising/control distinctions are in contrast to GB:

- The economy condition.
- Full interpretation
- The feature checking

⁸ Two suppositions in GB are retained in Minimalist theory: the θ -criterion and the priority of the θ -marking over movement. The first supposition is to maintain that one argument only bears one θ -role. It is prohibited to move from one θ -role to another. In raising predicate like (2), the raised NP moves to a position without a θ -role, in order not to violate θ -criterion. The second supposition is that one argument needs to satisfy the θ -role before movement; θ -role must be filled at D-structure before transformation. D-structure encodes the lexical items of the sentence. It shows the basic argument relations in the sentence. i.e., External arguments are based-generated in the subject position in terms of their predicate; the predicate in the base-position governs the internal arguments (Haegeman 1994:304-05). The D-structure undergoes movement transformations to present the S-structure, a level which presents the superficial structure of the sentence like word ordering and case forms.

➤ The Spell-Out

The economy condition copes with the requirements and the timing of the movement: greed and procrastinate⁹. These two assumptions follow the consequence of Minimal Link Condition (MLC), where the closest feature can move to check off the feature. Only one movement is possible under economy condition, and thus only one derivation is possible.

Full interpretation condition rules out the presence of the uninterpretable constituents like NPs without theta-roles. Features that encode semantic content are not eliminated during the strong feature checking and they are able to check more than one feature continuously in the derivation. The instance in (26) is unacceptable (Davies and Dubinsky 2004). The expletive NP *there* is not theta-marked and thus cannot be fully-interpreted at LF.

(26)*There seems [that Harold left early]

The feature-checking requires strong features to license the Case, via specifier-head or head-head movement. All the lexical items carry inflections and need to be checked by movement, such as Agr (agreement) and T (tense). After the movement, the checking features are deleted.

Last, the process of the Spell-Out specifies that only one derivation is possible, via three essential operations: select, move, and merge. The distinction between the D-structure and the S-structure is not clear in the Minimalism assumptions. The Spell-Out effect, approximately the S-structure, is the phase that maps it into PF representation during the process of the derivation (Culicover 1997).

Two major studies (see 2.1.2.1, 2.1.2.2) illustrate the basic assumptions above concerning Minimalist Program (MP): Chomsky and Lasnik (1993)'s Null Case Theory and Hornstein's (1999, 2003, Boeckx and Hornstein 2003) Movement-based approach. The former posits the concept of Null Case in order to satisfy

⁹ In MP, Chomsky (1995: 203) specifies that principle of greed constituents only moving for satisfaction of their own morphological requirements. The principle of procrastinate indicates that the occurrence of the movement is as late as possible in the course of derivation.

the feature-checking; the latter adopts some of basic assumptions to propose a novel perspective for the treatment of OC.

2.2.2.1 Null Case Theory

Following the basic assumptions in MP, Chomsky and Lasnik (1993) firstly argued that PRO Theorem loses its adequacy due to the empirical difficulty in (25). A number of questions are raised here in order to explain their analysis:

- What is Null Case theory?
- What are the assumptions of Null Case Theory?
- How does it work for the treatment of OC?
- What issues does it raise concerning the grammar of control?

The distribution of OC PRO is regarded “as a Case-theoretic phenomenon”; PRO has a null case on the basis of Case Theory (Chomsky and Lasnik 1993). Two assumptions are proposed in OC: (i) PRO has a null case and it favours the second assumption that (ii) PRO as a null case is a property of non-finite control. This null case can only be checked via specific feature checking– the T^0 (tense) of the non-finite control clause. This indicates that the tensed position I must be the feature [+ tense, – finite].

In (1a), PRO in the Spec IP is checked by the tense position of the non-finite clause. This PRO is assigned a null case by the tense position. This proposal resolves two empirical difficulties. It firstly distinguishes OC from raising because it is not allowed to move to another theta-marked position. In this instance, the ECM verb *expect* in (1a) is excluded because *Daniel* cannot move to check another theta-marked position. By contrast, (2b) is acceptable because the matrix subject is not theta-marked.

- | | |
|--|-----------|
| (1) a. *Daniel _i expected [t_i to leave] | [control] |
| (2) b. Jane _i expected Peter [t_i to leave] | [raising] |

Null Case Theory secondly explains the absence of lexical D/NPs in this [Spec, IP]; it regards null case as a property of the non-finite control. This assumption

explains the distribution of PRO between OC and NOC: PRO is in a non-finite position. Once PRO has a null case and it is only checked in T^0 , this null case satisfies the Spec IP position. If PRO has a null case, it resolves the ambiguity that PRO is a pronominal anaphor. This means that status of PRO is directly divided as an anaphor in OC and a pronoun in NOC, without the principle of the PRO Theorem. This assumption—null case as a property of non-finite control—accounts for the distribution of PRO, via specifier-head feature checking.

The theoretical problems in Chomsky and Lasnik's (1993) Null Case Theory suffers from its inelegancy that it is only used to fit in the observed facts (Hornstein 1999, 2003). The exception in (27) demonstrates that PRO can occur in the position other than [Spec, IP], which indicates that Chomsky and Lasnik's account is not complete (Hornstein 1999, 2003).

(27) John_i washed/dressed/shaved (PRO_i/ himself_i)

A further problem is that a null-case-marked PRO fails to block contraction. PRO parallels NP-trace rather than wh-trace, as seen in (29) (Hornstein 1999: 76). Lightfoot (1976) observes that unlike NP-traces, wh-traces block wanna construction. Jaeggli (1980) explains that in terms of Case, the phonological phrasing of wanna is blocked by Case-marked trace. If PRO is a Case-marked expression, it should behave like a wh-trace and block the contraction in (28).

(28) a. Who do you want [wh-trace to vanish]?

*Who do you wanna vanish?

b. John's going [NP-trace to leave].

John's gonna leave.

(29) a. I want [PRO to leave].

b. I wanna leave.

Although this Case-theoretic approach proposes a novel perspective on control, there remain some empirical exceptions. Hornstein (1999, 2003) suggests the distribution of PRO by virtue of Case theory: PRO occurs in the position without case-checking.

2.2.2.2 PRO as Trace

This proposal was proposed by Hornstein's (1999, 2003) work that treat OC in terms of movement. A number of questions are listed below:

- What is the difference between his settings and GB settings?
- How does he adopt Chomsky's (1995) basic assumptions under the MP framework?
- How does his proposal work for raising/control distinction?
- What issues does it raise in the grammar of control?

Hornstein firstly attacks the problems in GB, including the PRO Theorem and the Control Theory (see 2.1.1). Due to these problems, he suggests that PRO is ambiguous under GB and its dual status cannot distinguish between OC and NOC. He further explains the distinction between OC and NOC in the distribution as well as interpretation aspects. As a result, the existence of PRO is rejected by proposing PRO as Trace¹⁰. This follows a different data separation: OC is differentiated from NOC and incorporated with raising¹¹.

Hornstein secondly criticises Null Case Theory (see 2.1.1.1) and adopts Chomsky's (1995) assumptions, as listed in (30). The first assumption in (30a) is different from classical assumptions and Null Case Theory; θ -roles become determining features for checking in (30c). The second one is that Hornstein disperses the traditional view of θ -criterion; each argument can bear two θ -roles. (30e) resolve the problems in account of adjunct control by assuming the sentential subject is the controller via "the conventional movement" (Hornstein 1999, 2003).

(30)a. θ -roles are features on verbs.

b. Greed is Enlightened Self-Interest.

c. A D/NP "receives" a θ -role by checking a θ -feature of a verbal/predicative phrase that it merges with.

¹⁰ This also shows the similarity between his analysis and GB: PRO is phonetically null and caseless.

¹¹ This data set is identical to that in Structure Sharing analysis (see 2.1) but it deals with OC and raising at the level of syntax.

- d. There is no upper bound on the number of θ -roles a chain can have.
- e. Sideward movement is permitted¹².

His proposal firstly resolves the control phenomena by regarding OC as a specific raising through copy-delete and merge-move process. The process in (31) shows how his movement theory works for subject control. Firstly, the VP *Peter leave* merges with I *to* and the subject *Peter* moves to the specifier of IP. This gives the structure of the IP in (31c-e).

- (31)a. [_{VP}Peter leave]
- b. [_{IP}to [_{VP}Peter leave]]
- c. [_{IP}Peter_i to [_{VP} t_i leave]]
- d. [_{IP} Peter_i to [_{VP} t_i leave]]
- e. [_{VP} try [_{IP} Peter_i to [_{VP} t_i leave]]]

Next, the whole IP merges with the higher verb *try* and the D/NP *Peter* moves to Spec VP (31f). Finally, the matrix VP merges with a higher I and *Peter* moves to the Spec IP (31g). The theta-criterion determines that the verbs *try* and *leave* both assign a thematic role.

- (31) f. [_{VP} Peter_i try [_{IP} t_i to [_{VP} t_i leave]]]
- g. [_{IP} Peter_i I past[_{VP} t_i try [_{IP} t_i to [_{VP} t_i leave]]]]]

This movement-based approach further resolves the empirical difficulty of *promise-type* verbs¹³ by proposing a Null Preposition (Beockx and Hornstein 2003). The *Promise-type* predicates are marked conditions due to their late

¹² According to Minimal Distance Principle, there shows an exception like (i): the pronoun is bound by the object *wine*. The possible explanation is that a bound variable like a pronoun must be c-commanded by its antecedent, this implies that *it* in (i) is c-commanded by *no wine* at least at LF. If so, in contrast to the fact, then the object is able to control into adjuncts.

(i) John will drink no wine_i before it_i is ready for drinking.

In order to solve the problem of Rosebaum's (1967) Minimal Distance Principle (MDP), Hornstein (1999, 2003) proposes a "sidewards movement". This sideways movement involves a grammatical operation and this movement contains identical constraints that govern "more conventional kinds of movement" (ibid). (ii)b indicates the possible adjunct head.

(ii)a. Sidewards movement is a species of movement and it is possible

b. Adjuncts headed by *after*, *before*, *while*, etc. are adjoined to VP (or higher)

¹³ It is noticed by Rosenbaum (1967) and revisited by Culicover and Jackendoff's (2001) to challenge the movement-based approach.

acquisition: it is difficult for children to detect the reference in the bracket in (32) (Chomsky, C. 1969).

(32) John promised Mary [“John”/* “Mary” to leave]

A null preposition (P_{null}) is posited before the matrix object to account for the locality of MLC. In (33a), an invisible null preposition is in front of *Mary*, explaining the shortest movement in Hornstein’s analysis. This null preposition is understood to be difficult to detect during acquisition. Some semantically similar predicates like *vow* and *commit* in (33b) support this covert preposition.

(33)a. John promised [P_{null} Mary] [to leave early].

b. John vowed/committed [to Mary] [to leave].

Secondly, Hornstein’s (1999, 2003) proposal resolves the raising/control distinction in (34) and (35). Traditionally, only the idiom chunks and expletives can move in the raising construction. The example in (35) can be explained that only if PRO is an NP-trace. For the control predicate, the verb *expect* assigns a θ -role to the external argument. The expression *there* and *the shit* are not permitted to move to subject position in (35); the former is because of the fixed expression and the latter is because of its non-thematic role.

(34)a. The shit seems [**t** to have hit the fan].

b. There seems [**t** to be a man in the garden].

(35)a. *The shit expects [PRO to hit the fan].

b. *There expects [PRO to be a man in the garden]

2.2.2.3 Thematically-based Approach

A number of challenges criticise Hornstein’s assumptions and weaken his analysis of OC (Landau 1999, 2003; Culicover and Jackendoff 2001). One of the most important criticisms comes from Culicover and Jackendoff’s (2001) proposal. They attack Hornstein’s (1999, 2003) movement approach, in terms of a syntactic and lexico-semantic treatment. A number of differences are listed

below between the movement-based approach and the thematically-based approach¹⁴ in order to be explored later:

- Culicover and Jackendoff utilise a parallel approach, while Hornstein insists on the track of syntactocentrism.
- They favour the semantic distinction in raising/control, which cannot be detected at the level of syntax, while Hornstein thinks that semantic factor is hidden in the syntactic structure.
- They regard OC as Structure Sharing while Hornstein regards OC as NP trace.

Firstly, Culicover and Jackendoff (2001) use a combination of Lexical Functional Grammar (LFG) and Head-Driven Phrase Structure Grammar (HPSG)¹⁵. In semantics, they propose a Lexical Semantic approach in terms of thematic relations. They support the Structure Sharing analysis and the semantic distinction of the raising/control distinction. LFG/HPSG determines the argument relations of a verb in terms of the grammatical argument, whereas these of a verb are determined by theta assignment (Hornstein 1999, 2003; Boeckx and Hornstein 2003).

Secondly, they show subtypes of control in terms of thematic relations. For instance, they find that the thematic structure of the matrix predicate is considerably more effective on the selection of controller. Like the adjunct control in (36) and (37), the object *Susan* is embedded in a PP and it is not a controller. However, *Susan* is a controller in (38). The difference in controller between (36) and (38) lies in thematic the structures, not in the syntactic

¹⁴ Movement approach and thematically-based approach both reject PRO formative; one treats OC via movement while the other treats OC via Structure sharing.

¹⁵ Head-Driven Phrase Structure Grammar (HPSG) (Pollard and Sag 1994) is a non-transformational approach to grammar. It is regarded as a development of Generalized Phrase Structure Grammar (GPSG). HPSG uses a unification to unify two categories into one with all the information of the two. Thus, this category requires very few rules. In HPSG, the raised subject is a true direct object, as illustrate in (iii) (Culicover 1997: 50-1).

(iii)HPSG: believe x y
x is an NP,
y is a VP that has the argument structure(z,.....)
z is linked to x,
y is propositional,
y is *THEME*

structures. Culicover and Jackendoff (2001) find that in the verbs *promise* and *agree*, the controllers in (36) and (37) are determined by the source of the action which is denoted by the verb. The verbs of *order* belong to recipient control; the recipient of the verb is the controller of the adjunct.

(36)a. John's promise/vow/offer/guarantee/obligation/pledge/oath/
commitment to Susan to take care of himself/*herself.

b. John's agreement/contact with Susan to take care of
himself/*herself.

(37) John agreed with Susan to take care of himself/*herself.

(38) John's order/instructions/encouragement/reminder/invitation to
Susan to take care of herself/*himself.

Thirdly, since Hornstein treats PRO as Trace, one of the most important empirical challenges is Hornstein's failure in his classification of OC predicates. Culicover and Jackendoff (2001) argue this in several points.

- The first point is that, in Hornstein's (1999) analysis, the instance by using ECM verbs to demonstrate the properties of OC verbs due to Hornstein's false classification.
- The second point is that the distinction between OC and R-nonobligatory control¹⁶ is determined by lexical syntax.

These points will be presented in the following part. Firstly, in Minimalism, the collapse of raising and control is shown by the abandonment of the ECM

¹⁶ Culicover and Jackendoff (2001) suggest two subtypes in NOC: one is H-nonobligatory control proposed by Hornstein and the other one is R-nonobligatory control. In contrast to OC, R-nonobligatory control predicate in (iv)a does not show an anaphoric relation between the subject and its infinitive complement. Rather, it exhibits a structural control where the local antecedent c-commands the implicit subject. This R-nonobligatory control is exemplified by the verb *hope* in (49a), in contrast to the OC verb *try* in (49b) (Culicover and Jackendoff 2001).

(iv)a. John hoped (for Harry) to read *War and Peace*.

b. John tried (*for Harry) to read *War and Peace*.

Firstly, the verb *hope* can take either an infinitive phrase (InfP) or an infinitival clause (InfC) as a complement whereas the verb *try* only takes an infinitival phrase, detected by LFG/HPSG (Culicover and Jackendoff 2001). The fact in (iv) explains that the R-nonobligatory control predicate and the OC predicate license different infinitival complements respectively. Secondly, the subject of the matrix verb and the infinitive complement in (iv)b is identical. On the contrary, the subject identity of the matrix verb and the infinitive complement in (iv)a is not the same; the subject of the verb *hope* in (iv) is the NP *John* and the subject of the infinitive clause is *Harry*.

analysis (Davies and Dubinsky 2004:344). From Hornstein's approach, he regards the ECM verbs like *expect* in (1) as OC verbs.

Regarding Hornstein's (1999, 2003) interpretation of OC PRO, OC PRO can be paraphrased by reflexives. In contrast to the ECM verbs in (39), Culicover and Jackendoff use another OC verb *try* in (40). In (39), the ECM verb shows its properties of control, as Hornstein proposes. The subject *John* controls the infinitive in (39a); the verb *expect* takes a reflexive in (40b) or a noun in (40c) as an object. In addition, the verb *expect* can appear in raising construction like (40d); it can take a semantically null object. On the other hand, the control verb *try* cannot be reflexive like (40b) or a noun in (40c) as an object. In addition, the control verb *try* cannot take a semantically null object like (40d) (Culicover and Jackendoff 2001).

- (39)a. John expects [PRO to win].
 - b. John expects himself to win.
 - c. John expects Fred to win.
 - d. John expects there to be trouble.
- (40)a. John tried [PRO to win].
 - b. *John tried himself to win.
 - c. *John tried Fred to win.
 - d. *John tried there to be trouble.

Following the observation above, the object of the verb *try* cannot be paraphrased by a reflexive. This leads to an incorrect conclusion that *try* is not an OC verb, which is incompatible with the early literature in control (Lakoff; Perlmutter 1971; Jackendoff 1972; also see 1.1.1). The earlier finding showed that the verbs like *expect* can occur either in subject control in (40a), or an ECM (object raising) construction like (40c, d), in Bresnan's (1982) analysis.

The second point is that Culicover and Jackendoff (2001) find more evidence in (41)¹⁷. These pairs show a semantic parallel but not a syntactic one in the use of OC and R-nonobligatory control. One of the pair takes an InfP like (41a, c, e)

¹⁷ Culicover and Jackendoff suggest that the licensing conditions in (37e,f) is associated with subordinate conjunctions, not verbs.

and the other takes an InfC like (41b, d, f). The unacceptability in (41b, d, f) indicates different licensing conditions of the predicates. It shows that the verbs like *work*, *strive*, and *beg* are R-nonobligatory control predicates, while the verbs like *try* and *beseech* are obligatory control predicates. The pairs in (41) demonstrate that a possible lexically-syntactic factor affects the selection of the InfP or InfC.

- (41)a. John works/strives/tries to give his kids a better life.
 b. John works/strives/?tries very hard for his kids to have a better life.
 c. Sally begged/beseeched Bill to leave.
 d. Sally begged/*beseeched Bill for his kids to leave.
 e. Vera left the party in order/so as to keep Fred from getting embarrassed.
 f. Vera left the party in order/*so as for Fred not to get embarrassed.

In contrast to OC predicate, the properties of R-nonobligatory control predicate are summarised as below:

- In R-nonobligatory control, the controlled element has an appropriate antecedent.
- R-nonobligatory control predicates license either an InfP or an InfC: when they license an InfP, the controller is the matrix subject; when they license an InfC, the controller is the NP in Spec IP position of the InfC.

Though the movement-based approach make an improvement in its data set, it cannot differentiate the behaviour of ECM verbs and R-nonobligatory verbs from OC and raises more questions in OC analysis, as will be presented in 2.3 below.

2.3 Discussion

This section discusses the value of the movement-based approach and sees if it can accommodate as much empirical data as possible. Although a number of

scholars suggest that a pure syntactic treatment can account for control construction (Hornstein 1999, 2003; Boeckx and Hornstein 2003; Davies and Dubinsky 2004), several criticisms and questions arise in this movement-based approach. As for a thematically-based approach, its semantic model is not theoretically mature to give a systematic distinction of control. The second part addresses a parallel analysis—a treatment that combines syntactic and semantic primitives—in order to accommodate the empirical data and to resolve the theoretical problems.

2.3.1 Unsolved Questions

GB tradition provides a theory of control and PRO module in order to solve the empirical issues (see 1.2). The theory itself encounters more problems when resolving the data (2.2.1). Some scholars later suggest new perspectives to resolve the problems, such as Minimalism (Chomsky and Lasnik 1993; Hornstein 1999, 2003, Boeckx and Hornstein 2003) and Lexical Semantics (Culicover and Jackendoff 2001). On the attack of Culicover and Jackendoff (2001), they argue from a number of aspects in 2.2.2.3. Though an elaborate lexically-semantic model is not mature, they indeed indicate Hornstein's defects in terms of a parallel approach. Even in the reply, Boeckx and Hornstein (2003) cannot provide a plausible account for all the arguments. Therefore, this movement approach leaves a number of puzzles unsolved.

After comparing two different perspectives on control, some unsolved questions are:

- Can a pure syntactic or semantic approach resolve all the control issues?
- Which one can account for the distribution and interpretation of implicit controlled elements?

Starting from the first question, we examine the value of a pure syntactocentric approach. Hornstein's generalization (1999, 2003) proposes a new perspective about the data separation between control and raising by assuming that control is a specific raising. His data cut is compatible with the unification of the control

and raising¹⁸. To resolve OC issues, the assumptions in (31) have following advantages (Hornstein 1999, 2003)

- This novel approach retains the characteristics of OC: the c-command relation, boundedness, and Minimal Link Principle.
- The assumptions in (30) favour the prohibition of split antecedents.
- These assumptions can account for the ambiguous readings of PRO in 2.2.1.
- This movement approach accounts for the raising/control distinctions.

Firstly, Hornstein claims that these assumptions accommodate three properties of OC: the implicit subject of the non-finite complement must have a c-commanding antecedent like *John*; the implicit subject is locally A-bound by the antecedent; thirdly, it satisfies Minimal Link Condition. In (42b), the implicit subject in the lower Spec IP is c-commanded and bound by the subject of the higher Spec IP. The implicit subject selects the nearest NP *John* as its antecedent.

(42)a. John hopes to leave.

b. [_{IP} John [_{VP} John [hopes [_{IP} John to [_{VP} John leave]]]]]

Four empirical problems challenge his first value. The first problem is that the *hope*-type predicates are classified as R-obligatory control (cf. in Culicover and Jackendoff 2001). The instance in (42a) exhibits a control shift; the controller is the surface subject when *hope* takes an InfP whereas the controller shifts to *Harry* when *hope* takes an InfC (Culicover and Jackendoff 2001). This subclass of NOC is not detected by a movement approach. Thus, Hornstein's account is not sufficient in the distribution of PRO.

The second problem is that the analysis of ECM predicates weakens Hornstein's treatment (see 2.2.2). Since the method he classified between OC and NOC is obscure, the characteristics he proposes are not reliable to account for OC.

¹⁸ His data cut is consistent with the data cut in LFG. Two differences result in the distinct treatments between both. The first difference is that in Minimalism, the argument is assigned by theta criterion, whereas in LFG, the argument is assigned by grammatical function. The second difference is the analysis of ECM predicates; Minimalists disperse the special status of ECM verbs, whereas it is retained in LFG.

The third problem is that Null preposition proposal for *promise* raises more issues in his approach. Hornstein claims that MLC is “exceptionless” (Hornstein 2003:33), but he can not account for *promise*-type verbs. Later, Boeckx and Hornstein (2003) explain that *promise* is marked due to its late acquisition, as proposed by Carol Chomsky (1969). On the basis of the following reason, it is difficult to understand what exactly the markedness he indicates and to apply his specific treatment to *promise*.

In MLC, Boeckx and Hornstein (2003) treat *promise*-type verbs as a marked construction by virtue of the late acquisition. A specific treatment for *promise* is thus expected by positing a null preposition (see 2.2.2). One question is that we are not certain whether the reason of the late acquisition is influential enough to offer a special treatment. A further question with his approach comes from the evidence in (43): the verb *promise* appears to fit his proposal in the passivisation; the sentential subject *Daniel* is the controller of the adjunct. This counterexample weakens the existence of null preposition proposal in movement-based treatment.

(43) Daniel is promised (by his father) to have a new bicycle.

In addition, Boeckx and Hornstein (2003) propose some predicates with related meaning, like *commit*. The instance in (44), it shows that the verb *promise* may not be syntactically similar to *commit*. According to Levin’s (1993: 48), *promise* is a verb of future having under the category: verb of change of procession. The reason is that the indirect object of *promise* in (44b) must be animate, as shown in (44c). The semantic distinctions between *promise* and *commit* affect their syntactic representations.

- (44) a. They are unwilling to commit themselves to this opinion.
b. *They are unwilling to promise themselves to this opinion.
c. Daniel promised a bike to his son.

The final problem is that a movement-based approach offers no explanation of the instances like (45) (Landau 2003). Rather than the sentential subject, the

controller is implicit in the surface structure so the controller cannot be found in this sentence. This evidence demonstrates the inadequacy of his account.

(45) John was hoped to win the game.

The second advantage is attacked by the empirical evidence in (46). Regarding his second value, two separate expressions cannot be the antecedents simultaneously because they cannot move into the same position. The counterexample is found in (46) that PRO can refer to the split antecedents *farmers* and *ranchers* (Frederick 2003).

- (46)a. ..., we should expect farmers and ranchers to leave the land.
 b. we should expect farmers_i and ranchers_j to PRO_{i+j} leave the land

The third value is challenged by the VP ellipsis test in (47)-(49). The facts show that the assumptions in (30) cannot account for the ambiguous reading of OC¹⁹. The controlled VPs are proposed to be treated by the conceptual structures, not by the syntactic relations (Culicover and Jackendoff 2001). Hornstein (1999, 2003) claims that the ECM verb *expect* presents a Merge and Move structure in (47). The phrase *expects to win* is deleted in PF, as suggested by Chomsky (1995). This theory prohibits the noun phrase *Bill* from being assigned θ -role due to reconstruction in LF. The counterexample in (49) objects to Hornstein's theory, particularly in (49d). Hornstein cannot provide any syntactic explanation of what is deleted in PF or reconstructed in LF. Following the observation, the antecedent of matrix VP anaphora is determined as a conceptual structure (Culicover and Jackendoff 1995). The controller in (49d) is determined by the distinction of focus and presupposition.²⁰

¹⁹ Under Hornstein's analysis, the implicit subject in (v) is controlled by the matrix subject *Churchill* (1999: 81). The subject of the complement *giving the BST speech* is the matrix subject *Churchill*. It merges with the verb *remember* and raises to the subject of the whole VP. Then, it moves to Spec IP.

(v) Only Churchill x [x remembers x giving the BST speech]

²⁰ This result follows Chomsky's (1972) argument. The syntactic account in (49) violates a number of syntactic constraints on movement.

- (47) John expects to win and Bill does too.
- (48) a. John tried to win and Bill did the very same thing.
 b.and Bill did the opposite.
 c.and Bill did likewise/similarly.
 d. Sally tried to seduce Stuart, Liz did the same thing with Dan.
- (49) a. ?and Bill did the very same thing as try to win.
 b. ?and Bill did the opposite of trying to win.
 c. *and Bill did likewise/similarly as/of/to trying to him.
 d. *and Liz did the same thing as try to seduce (Stuart) with Dan.
 (acceptable only under the wrong meaning)

The fourth advantage is that this “PRO as trace” accounts for the distinction between control and raising (1999:82). Hornstein’s analysis treats OC as a specific kind of raising. (35) can be explained that only if PRO is an NP-trace. In control predicate, the verb *expect* assigns an θ -role to the external argument. The expression like *there* and *the shit* fail to move to the subject position in (35); the former is because of the fixed expression and the latter is because of its non-thematic role.

Following Hornstein’s assumptions, it is difficult to explain why the OC predicate *expect* in (50a) and (50b) has a raising construction but *persuade* in (50c) and (50d) does not. In fact, the distinction in (50) and (35) can be differentiated only by theta-criterion and the idiosyncrasy of *there* and *the shit* without the syntactic derivation. This demonstrates that semantic factors need to be taken into consideration, in order to capture the gaps between syntax and semantics.

- (50) a. Daniel expects the shit to **t** hit the fan.
 b. Daniel expects there to **t** be a man in the garden.
 c. *Daniel persuades the shit to **t** hit the fan.
 d. *Daniel persuades there to **t** be a man in the garden.

In summary, a syntactocentric approach claims to account for the distribution and interpretation of implicit subject in non-finite complement. Unfortunately, some inadequacy and insufficiency exist in Hornstein's assumptions. A number of counterexamples weaken his treatment of OC. Back to empiricism, a plausible approach is still required to accommodate all the data. This indicates that a pure syntactic analysis needs to fill in its blank without semantic or pragmatic support.

To answer the second question, the next section turns to the possibility of a parallel approach of control. Due to the inadequacy of single approach, it is likely to have a parallel approach since a pure syntactic or a pure semantic approach raises problematic issues.

2.3.2 A Parallel Treatment

After revisiting Hornstein's movement-based approach, some empirical and theoretical problems are still left unsolved. Culicover and Jackendoff's (2001) work employs a parallel treatment for control: LFG/HSPG and Lexical Semantics. Their thematically-based approach provides a novel perspective for the number of controllers and a number of challenges to the movement-based approach. Though it is not explicit how they account for the distribution of implicit subject, this parallel treatment suggests that semantic factors affect the selection of the controller. The following part suggests three reasons to support a parallel analysis.

- The first reason is that parallel approach can show both syntactic and semantic analyses in order to find out which kind of distinction exists between control and raising.
- A parallel approach helps us to exhibit the mismatch between syntax and semantics in control and raising.
- It is felicitous for a parallel approach to capture the empirical data, not only looking at one side of the data.

Firstly, a number of controversies arise for what kind of distinction between control and raising exists. A long list of literature has suggested the semantic

influence affects the selection of controller to some extent (see Jackendoff 1972, 1974; Bresnan 1982; Ruwet 1983, 1984; Cattell 1984; Chierchia 1988; Farkas 1988; Sag and Pollard 1991). Chomsky (1986: 78-9) points out that the phenomena of control associates with some semantic factors, like the intrinsic properties of verbs, semantic and even pragmatic information.

Following Bresnan's (1982; Hudson 1984, 1990, 2005; Langacker 1995) analysis, control and raising can be collapsed syntactically and distinguished semantically. Landau's (1999, 2003) assumption also follows by assuming that the types of control are semantic distinctions.

On the contrary, some scholars insist on the syntactic account for how the controller is distributed and how it is interpreted (Hornstein 1999, 2003; Boeckx and Hornstein 2003; Davies and Dubinsky 2004). In order to illustrate how control and raising work, it is convenient to present a parallel analysis. By virtue of a parallel approach, we not only examine the different construals but also its syntactic and semantic explanations.

Secondly, the issue of the syntax-semantic mismatch has grown in importance in light of recent concern in control and raising (Chomsky 1986, 1995; Santorini and Kroch 2000). More recently, literature has suggested a contradictory finding, that in English, this mismatch exists only in raising, not in control (Hudson 2005). Inevitably, the validity of this finding must be examined by an appropriate model. This heuristic model exhibits the control and raising data and their syntactic and semantic counterparts in order to highlight the mismatch, if there is one. Therefore, a parallel device facilitates the theoretical comprehension of how, what and where the mismatch is distributed. This further proposes a more suitable treatment for linguistic phenomena.

The third reason goes back to empiricism, where an elegant approach must undertake a series of empirical tests (Davies and Dubinsky 2004). If this approach cannot account for all the empirical data, some exceptions reflect its theoretical issues such as the earlier problems in GB framework (2.2.2), Null Case theory (2.2.2.1), and some challenges to a movement-based approach and a

thematically-based approach. These problems force us to produce more theories to treat raising/control until both are sorted out by a plausible account. A proper model with excellent representations thus is needed.

To summarise, this chapter presents two competing approaches: a movement-based approach and a thematically-based approach. Under the Minimalist's framework, Hornstein (1999, 2003) proposes that OC is a specific kind of raising. This provides a different data separation from the earlier analysis. Based on joint assumptions, Culicover and Jackendoff (2001) propose a parallel approach to challenge the syntactocentric treatment. Among their arguments, there are some empirical difficulties (how to distinguish R-nonobligatory control from OC) and theoretical problems (null preposition proposal). In addition, some concepts are not explicitly explained, like the distribution of the controller in terms of lexical semantics. The discussion has presented more defects for a single approach. It further suggests a parallel approach in order to explore the type of the distinction, the mismatch and a plausible account.

This WG model will be introduced in Chapter Three. It contains three parameter settings to understand how syntax, semantics, and cognitive science interact in control and raising. This parallel approach attempts to re-examine control and raising and to show the validity of our assumptions in relation to raising/control.

3 Alternative: Network Representation

This section examines raising/control in terms of Word Grammar model (Hudson 1984, 1990, 1999). A parallel model will be suggested at the end of this discussion. There are several assumptions that can be presented for a Network Model:

- Control and raising are semantic distinctions.
- These semantic distinctions can be shown through a systematic representation.
- The PRO formative does not exist in English.

The first assumption favours a number of earlier analyses (Bresnan 1982; Landau 1999, 2003; Dalrymple 1999; Culicover and Jackendoff 2001; Asudeh 2002). This does not exclude the syntactic factors but suggests that the distinctions can be captured more precisely in terms of a lexico-semantic technology. WG model keeps its syntactic representations and further shows whether syntactic or semantic distinctions in raising/control.

The second assumption comes from Culicover and Jackendoff's request for a mature semantic analysis for the distribution of the controller. "The fact that predicates with parallel thematic control are semantically similar suggests that a full explanation lies in a more complete theory of lexical semantics than is available at present" (Culicover and Jackendoff 2001: 510). In the semantic representation of WG model, we incorporate some important parameters and relations, such as the force-dynamic relations (Talmy 1985), event types (Croft 1990), and verb's classes and alternations (Levin 1993). These factors exhibit the idiosyncratic meaning of the verb and how it affects the syntactic structures.

The third assumption is suggested by a number of theories like the movement-based approach and thematically-based approach. Though they employ different treatments for OC PRO, they both reject the existence of the PRO formative in English. The WG model, which will be presented in 3.2, demonstrates this assumption (Hudson 1984, 1990, 2005).

After presenting the assumptions, the next section presents the parameter settings in the WG model. It exhibits a parallel analysis for raising/control distinction in terms of joint parameter settings.

3.1 Parameters of Word Grammar Model

This section presents the parameter settings of Word Grammar (WG) Model (Hudson 1984, 1990, 2005); Dependency Grammar (DG), Lexical Semantics (LS) and Cognitive Grammar (Lackganker 1995; Taylor 2002). Firstly, this model can display the mismatch between syntax and semantics through its syntactic and semantic relations. Secondly, cognitive science assists us to

understand the intrinsic implications of raising constructions and to see how it interacts with the lexico-semantics (Sakai 2005).

3.1.1 Dependency Grammar

Dependency grammar is derived from Paninian grammar (Bharati, Vineet Chaitanya et al. 1995) and from the ancient grammars of Greek, Latin (Covington 1984; Percival 1990) and Arabic (Owens 1988). The primary unit in syntax is word, and each word has grammatical relations with each other; the grammatical relation is shown the term ‘dependency’. This dependency shows the asymmetry between superordinate and subordinate word, as show in Figure 1 (Hudson 2005: 157). In Figure 1, the main unit of the sentence is word, and each word is linked by different kinds of dependency. The grammatical relation of *sentence* to *structure* is adjunct; the relation of the verb *hold* to *structure* is subjective; the relation of *challenges* to *hold* is objective.

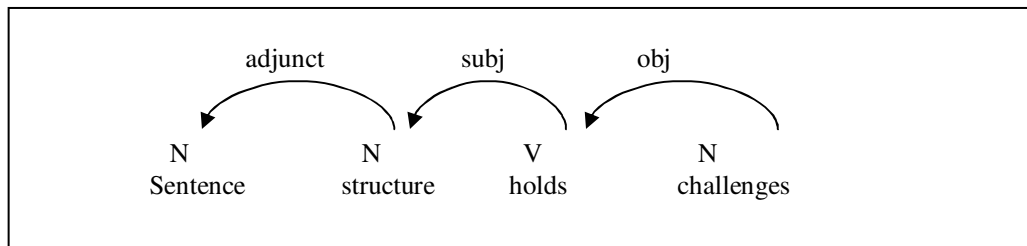


Figure 1: Sentence structure holds challenges

Contrary to other syntactic theories, there are four characteristics of a dependency structure (DS). Firstly, grammatical functions are essential and can be divided into different types of dependency in DS. For instance, in the network in Figure 1, different grammatical connections link between words, with each word being represented by a single node.

Secondly, DS does not have phrasal nodes. Hudson (2005) claims that “the vertical relations of a word to its phrase are in fact more or less real than its horizontal relations to other words”. From Figure 1, in contrast to the phrase *Sentence structure holds challenges*, the verb *holds* is more related to the neighbouring elements, the subject *structure* or the object *challenges*.

Thirdly, in DS, a single node represents a word. This denies unary branch²¹ where a single unit obtains two distinct categories; the single unit *challenge* receives two nodes, one is identified as a noun and the other as a noun phrase.

Finally, following a-single-node-as-a-single-word assumption in DS, the traditional subject-predicate like NP-VP is impossible. In the example *John hits Daniel*, the word-token *hits* is represented by a single node and it has dependents *John* and *Daniel*. Thus, there is no VP. The consequence is that no c-command relation is displayed in the network: no geometrical asymmetry between the subject and the object. This distinction separates DS from other syntactic analyses such as phrase structure theories. Based on DS, WG theory is composed of five components (Hudson 2005:146):

- The first one is ordinary dependencies that may embody the meaning and have inter-relation with other words, like selection or agreement.
- The second is the term ‘landmark²²’, borrowed from cognitive grammar.
- Parents are landmarks: a parent is the word which it depends on and a word’s parent is its landmark.
- Subordinate parents are not landmarks.
- Some extra dependencies²³ combine with ordinary dependencies.

3.1.2 Lexical Semantics

Although the concept that control and raising belong to semantic distinctions is proposed (Bresnan 1982; Landau 1999, 2003; Culicover and Jackendoff 2001), a systematic treatment never appears in terms of semantic relations. For instance, though LFG has a parallel architecture, known as Glue Semantics (Dalrymple 1999), it must rely on the syntactic mapping and cannot be construed independently (Debusmann 2006).

Alternatively, by positing the lexico-semantic elements in WG model, it can deal with semantics independently and the interaction with syntactic influence.

²¹ Unary branching is the main part of X-bar Theory and also some other kinds of phrase structure, as Hudson points out (2005: 130).

²² In WG, it is adopted to have two subtypes: ‘before’ and ‘after’. A landmark is transitive to maintain its dependents and the relations with groups of phrases.

²³ In WH-extraction effect, a word (extractee) raises to dependent on its grandparent even though it depends on the parent at the same time.

Without a mature semantic device, the distinction is only observed on the basis of syntax. It is thus difficult to obtain a deep semantic influence in the surface or deep structures. Culicover and Jackendoff's (2001) thematically-based approach is construed on LFG/HPSG and no analytical tool in terms of lexico-semantic primitives, the result, therefore, is not a cohesive explanation and it does not explain any deep semantic influence (Boeckx and Hornstein 2003).

The network in a lexical analysis assists us to decompose the meanings encoded in a verb and to uncover how different meanings in a verb derive distinct syntactic structures. In fact, some scholars have applied the network to the lexical decomposition (Gisborne 1996; Holmes 2005). In Lexical Semantics, this model presents:

- The specific linking relations
- The relations between the participants, e.g. force-dynamic relation²⁴
- The encoded meaning of the predicate and the event types
- The semantic relations between the predicates and their arguments
- The category of each entity

Take Figure 2 as an example. Firstly, the linking relation is specified by the arrows in order to show different linkings; the link between the two subevents is result relation, which denotes a causative construction; some other relation such as realization, sense, and referent²⁵. Secondly, the 'er' and 'ee' of *force* form a force-dynamic dyad; *Daniel* acts on *John*. Thirdly, the single event 'forcing' interacts with the catenative construction since the causal element constitutes in the meaning of the verb. The *verb force* is suggested to encode a 'causing' meaning to form a causative construction (Croft 1990).

²⁴ This relation is firstly proposed by Talmy 1985. The participant which puts the force to its opposite is known as an antagonist; the opposite which bears the force is known as agonist. Force-dynamic role further assists the conceptualization of causation lies in the Agonist: "the Agonist's resultant state of activity is the opposite of its intrinsic actional tendency" (Talmy 1985). This configuration constrains the referent condition and in the causatives and provide a focal diagnosis of the relation between the participant in the constructions. This construal model is also widely used in cognitive linguistics (Croft and Cruse 2004).

²⁵ The term 'realisation' refers to the form which is realized in the S-structure. For instance, the realization of FORCE is 'forced' due to the aspects. The term 'sense' refers to "the permanently stored meaning of a word" (Gisborne 2006). The term 'referent' is the actual entity in the discussion.

Fourthly, the semantic relation between the predicate ‘moving’ and its argument *doctor* forms a path relation, which implies a destination. Finally, the inheritance property is specified by the hierarchical level of each entity. For instance, ‘acting’ and ‘moving’ are identified as events; *Daniel* and *John* are things. Through the interaction between the relations, participants, relation and participants, the network displays the predicative information: what components the verb denotes, how these components affect each other, and how they interact with the syntactic structures.

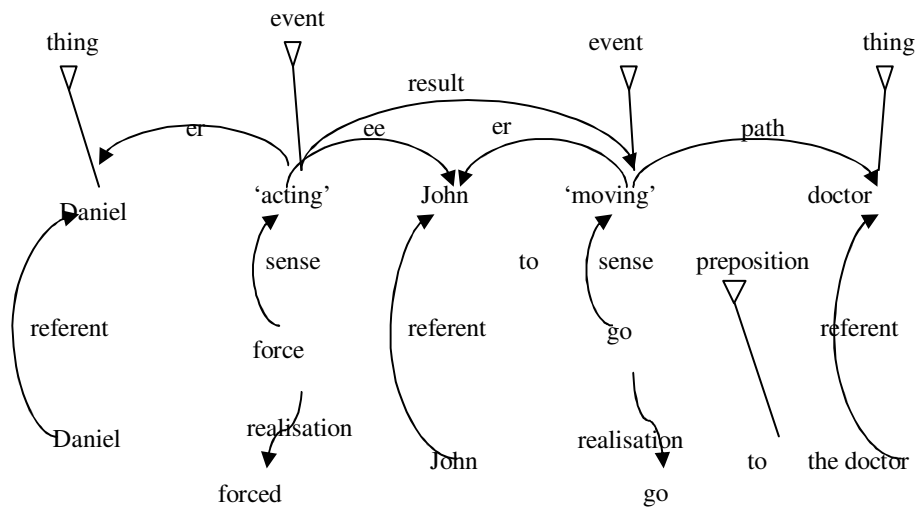


Figure 2: Daniel forced John to go to the doctor

3.1.3 Cognitive Grammar

Sakai (2005) finds that Lexico-semantic process is related to a number of cognitive factors in the cortical regions. The cognitive concepts must be taken into consideration in the network, for the purpose of gaining picture of how our mental grammar works. Langacker (1995) refines the ‘raising’ constructions in terms of cognitive grammar and resolves the problem arising from the traditional analysis, such as the ambiguity of polysemy, the status of grammatical elements, idiom chunks and syntactic dummies. He identifies the three raising constructions and explores the differences between the raising and control verbs.

Lackganker (1995) conclude that all the raising construction display a transparency: the main clause itself imposes no constraints on the “raised” NP—its structural motivation comes from its role in the subordinate clause

(Langacker 1995). For instance, the predicate in the main clause does not constrain the raised NP *Don* in subject-to-subject raising (51), object-to-subject raising (52), and subject-to-object raising (53). The raised NP originates from the subordinate clause.

(51)SSR: Don is likely to leave.

(52)OSR: Don is easy to like.

(53)SOR: I expect Don to leave.

Raising construction is a special case of active-zone/profile discrepancy (metonymy) (ibid: 25). A participant's active zone related to a profile relationship is not a thing; it is a relationship in which it figures. The notion that a relation might function as an active zone has independent motivation. The active zone is shown as infinitival²⁶ in (51), (52) and (53). When the raised NP *Don* is participating in the infinitive, it designates a relation and profiles an active zone. The predicate is associated with the relations because the raised participant is embraced in infinitive relations.

By contrast, control predicates impose a number of constraints on the landmark above and beyond its role as major participant in the infinitival process (Langacker 1995). This indicates that raising and control are semantically distinct. The sources of transparency interact with the properties of verbs to composite various raising structures.

3.2 Control in Word Grammar Model

Hudson (2005) regards PRO/*pro* as an unrealized word. This covert element displays a mismatch between syntax and semantics: PRO/*pro* is syntactically identified but semantically null. Due to its redundancy in the network, the existence of PRO is rejected in English. Hudson (2005) employs 'r' as a sharer of the subject argument. This sharer relation rejects the English PRO formative and the control by movement. The following section illustrates different controls

²⁶ The meanings of grammatical elements they contain: in grammatical elements, such as infinitival *to*, This atemporal element is suggested to profile a future active-zone in the event (Langacker 1995; Taylor 2002)

in the WG model and explores how to distinguish them in the distribution and interpretation.

3.2.1 Subject Control

The network representation of subject control in (32) is displayed in Figure 3. This diagram consists of two parts: above is semantic and below is syntactic. In the syntactic representation, the NP *Peter* is the subject of the matrix verb *try*, and infinitival marker *to* and the non-finite verb *leave*. Thus, *try* takes *to* and *leave* as a sharer; both are the complements of *try*.

In semantic representation, the first subevent ‘try’ causes the second subevent ‘leave’, which is linked by a result relation. The role of *Peter* is the ‘ers’ of *try* and *leave*. In subject control, the ‘er’ of the first subevent is also the ‘er’ of the second subevent. This ‘er’ role projects the constraint on the controller that the subject denotes a capability of performing the action for the first and the catenative event.

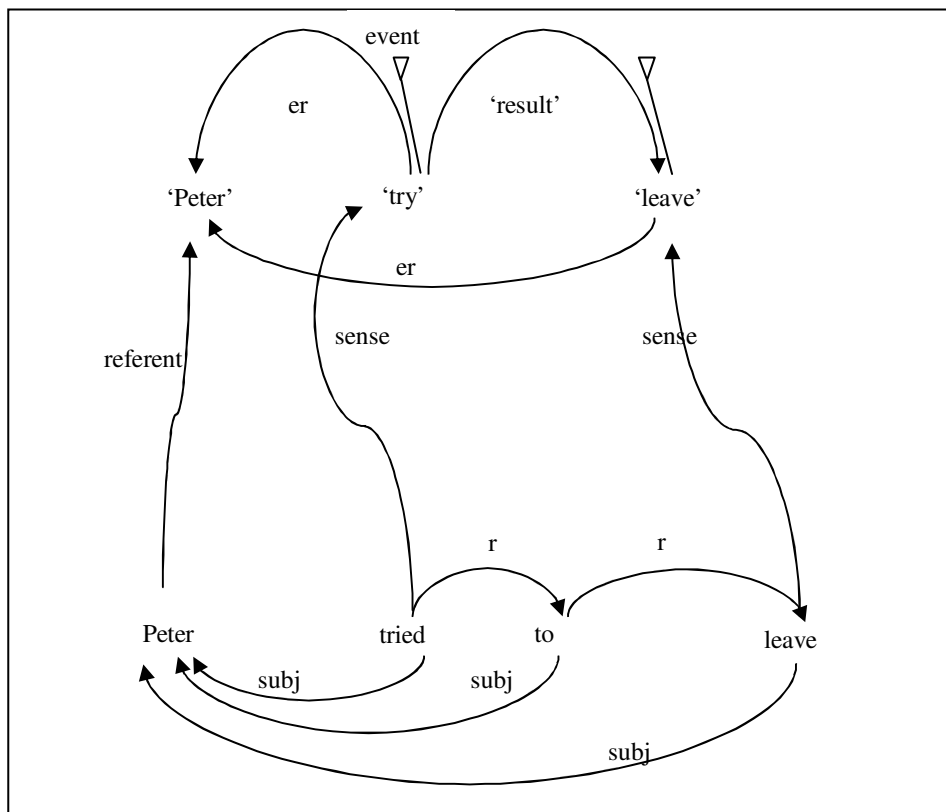


Figure 3: Subject control

3.2.2 Object Control

The network representation of object control in (34) is shown in Figure 4. Firstly, the subject of the matrix verb *persuade* is *John* and the object is *Mary*, linked by subject and object dependency. *Mary* is the subject of the infinitival *to* and the nonfinite verb *go*, which are linked by subject dependencies. Thirdly, *Persuade* takes the infinitival *to* as a sharer and *to* takes the verb *go* as a sharer.

In semantic analysis, *persuade* firstly projects constraints on both ‘er’ and ‘ee’; both of them are animate. Secondly, the first subevent *persuade* brings out the second subevent ‘going’, which is specified by a result relation. Thirdly, there is a force-dynamic dyad between *John* and *Mary*: *John acts on Mary*. Fourthly, *Mary* is the ‘er’ of the catenative construction led by *to* in the realization. This infinitive *to* is encoded with a future orientation (Taylor 2002).

Note that the syntactic representation in control parallels its semantic counterpart, such as the linking relations and the role of the participants. These data show that control does not exhibit a mismatch in English. This result is compatible with the earlier literature of Control theory.

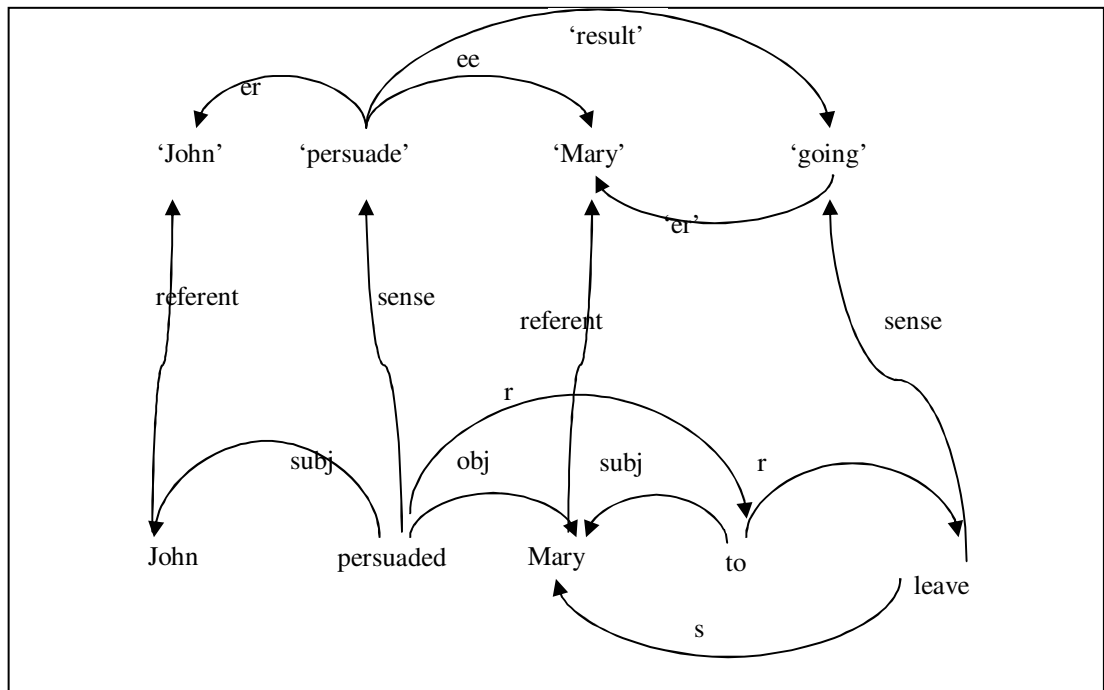


Figure 4: Object control

When comparing two subtypes of control, some interesting points are:

- The syntactic property is that in syntax, the selection between subject and object control is determined by whether there is a theta-marked object licensed in the control predicates.
- The semantic property is that the controller is the ‘er’ of the catenative construction in both control types. The difference is that the object control predicates denote a causative construction and a force-dynamic dyad. The selection between subject and object control is determined by whether the agonist is the ‘er’ of the catenative construction.
- In the network, the syntactic representation parallels its semantic counterpart. The diagram supports the assumption that PRO does not exist in English²⁷.

The first point is compatible with a number of previous analyses because it cannot capture the predicates like *promise*. In contrast, the lexically-semantic generalisation can accommodate *promise*-type verbs. For instance, the control in (32) is a subject control rather than object control. Though *Mary* is a theta-marked object, it is not the subject of the nonfinite clause. This syntactic distinction is not sufficient to distinguish between different types of control predicates.

The linking relations and the relations between the participants capture this distinction. The *Promise*-type model, regarded as a ‘marked’ case in the literature, presents its decomposition analysis in the Figure 5-7. *Promise* is classified as verb of ‘future having’ in the verb of change possession (Levin 1993: 139). The instance in (32) could have possible interpretations like (54a) and (54b), which are shown in Figure 5 and 6 respectively.

(54)a. John_i promises Mary_j to leave_i

b. John_i promises Mary_j to leave_j

²⁷ Hudson (2003) suggests that the existence of PRO formative is found in Icelandic.

Figure 5 is shown in the model of subject control; *John* is the promiser and the leaver. *John* is the haver of the future event; *John* is the ‘er’ of the ‘having’ and the ‘having’ event cause the second event ‘leave’. The interpretation is that *John promises Mary that John will leave*. The ‘er’ of ‘having’ carries out the second event rather than the promiser. It further supports this assumption of polysemy of the verb.

Figure 6 indicates that the ‘er’ of having is *Mary*; *Mary* is the one who performs the second event. In the construal of *promise*, the encoded meanings are polysemous; *promise* denotes a having meaning to specify the haver to perform the promised event. The promised event needs to be realised by the person who will perform the future event, not by the promiser.

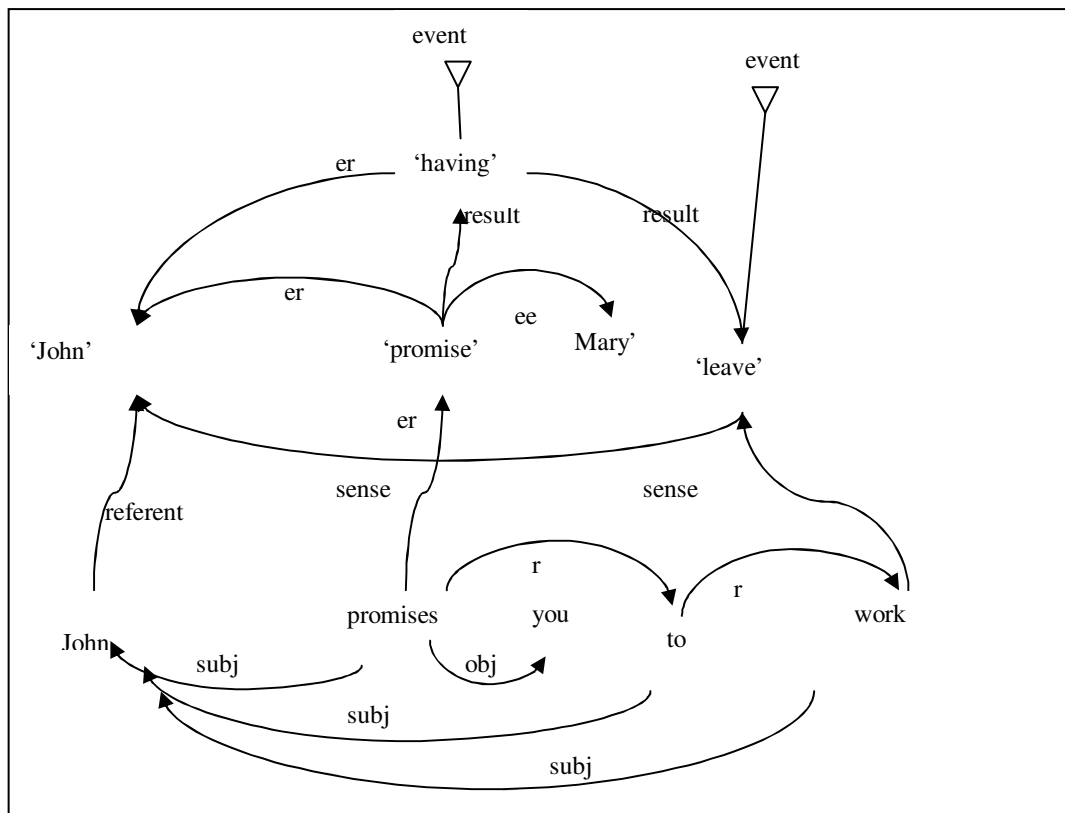


Figure 5: John_i promises Mary_j to leave_i

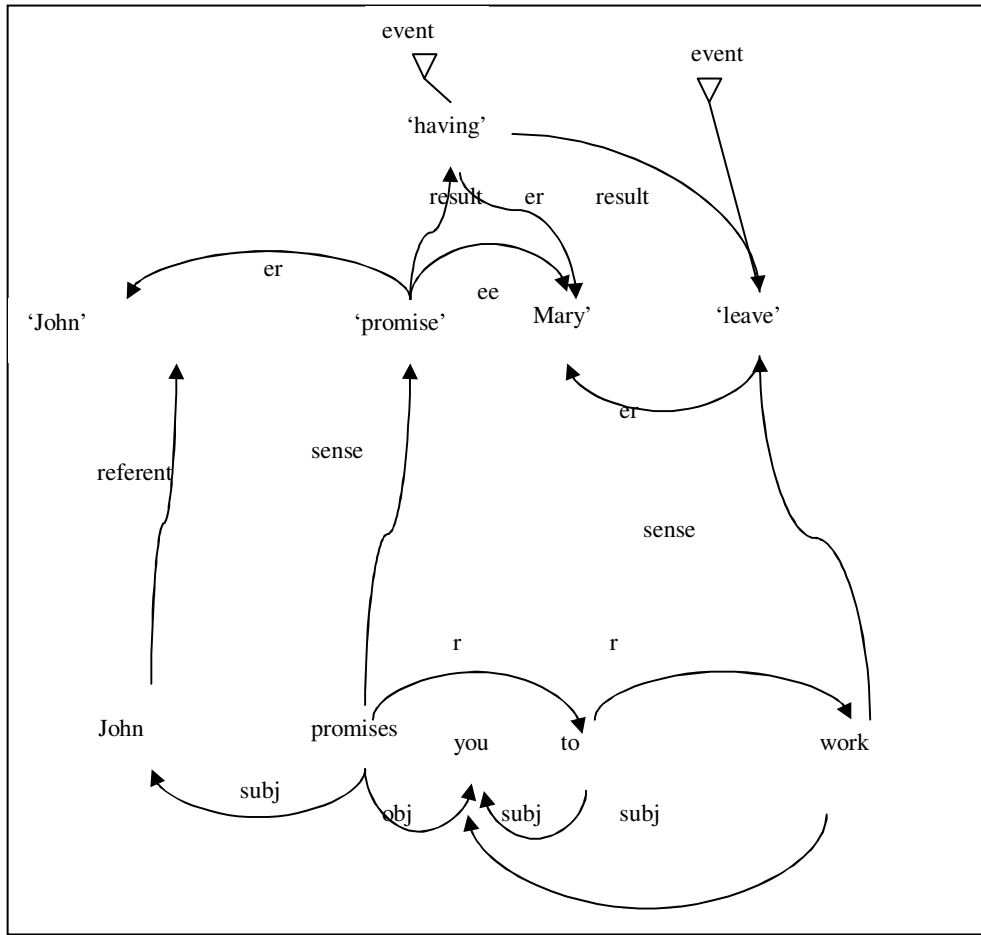


Figure 6: John_i promises Mary_j to leave_j

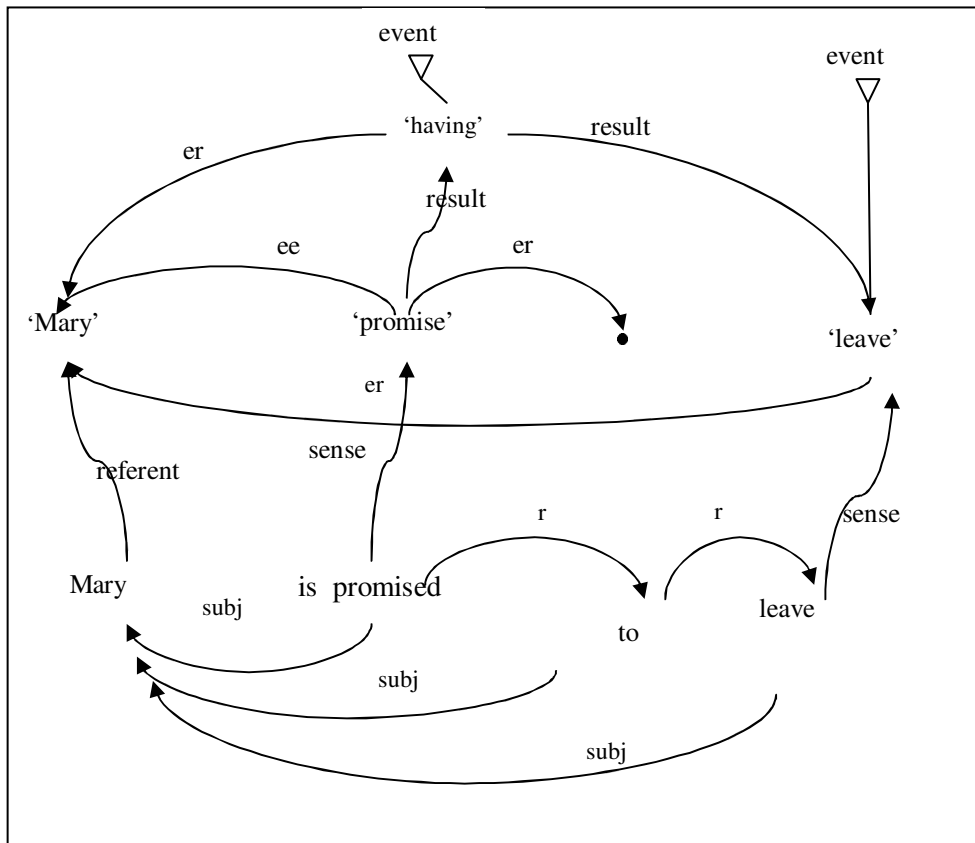


Figure 7: Mary is promised to leave

The passivisation in (54b) supports this assumption. The controller is determined by the haver. Consequently, *Mary* is the haver of the promised event; *Mary* is the one who carries out the ‘leave’ event. This dissolves the issue about the selection of the controller in terms of syntactic structures or thematic relations. The result favours Culicover and Jackendoff’s (2001) conclusion that a deep semantic influence affects the selection of the controller.

In summary, the network model exhibits the subtypes of control in terms of a parallel approach. Our generalization is that the distinction between subject control and object control can be captured by its semantic properties. The method of differentiating object control from subject control is determined by whether the agonist is the ‘er’ of the catenative relations. Furthermore, in English, no mismatch is found in control.

The next section introduces the network representation of raising construction: raising-to-subject and raising-to-object. The network representation exhibits a syntax-semantics mismatch in raising. The mapping presents how the raising predicates are associated with its arguments and relations.

3.3 Raising

Figure 8 and Figure 9 display syntactic and semantic representation of raising construction. The above is the semantic representation whereas the below is the syntactic counterpart. This parallel analysis helps us understand how the syntax-semantics mismatch is distributed and how the cognitive concepts work.

3.3.1 Subject Raising

Figure 8 presents a raising-to-subject model. In syntax, *Peter* is the subject of the raising predicate *seem*, the infinitival *to* and nonfinite verb *leave*, specified by the subject dependency. *Seem* is a sharer to the infinitival marker *to* and the nonfinite verb *leave*, linked by an ‘r’ arrow to show the association.

In semantic aspect, this network displays the *Peter* presents the transparency because it is not directly associated with the raising predicate *seem*, which denotes a probability. *Seem* is associated with the relation *Peter leave* and this relation is the ‘er’ of *seem* (Langacker 1995). In this relation, *Peter* is the ‘er’ of

leave. In the realisation, the relation is divided into two parts: the raised NP *Peter* and the catenative construction *to leave*; *to* specifies a future active zone.

The mismatch is shown by different linking relations. In syntax, the linking relation between *Peter* and the raising predicate is linked by subject dependency. On the contrary, no arrow shows between *Peter* and *seem* in the semantic representation. The relation is the ‘er’ of the raising predicate.

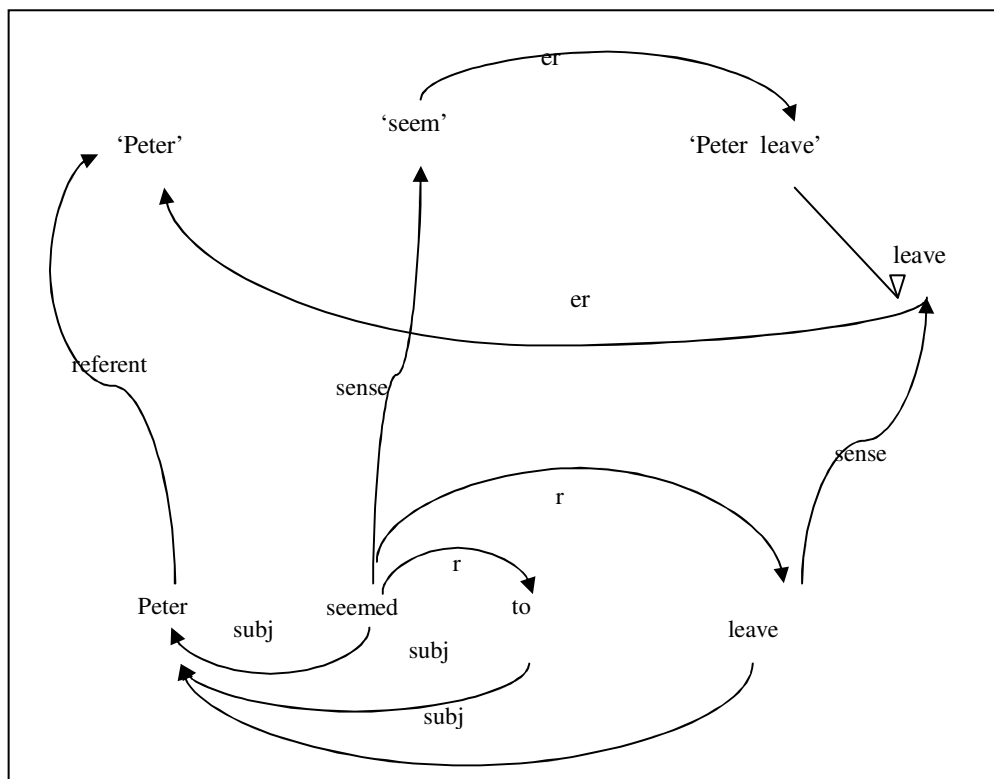


Figure 8: Raising to subject

3.3.2 Object Raising

Figure 9 displays the parallel analysis of object raising. In syntactic representation, *Jane* is the subject of the raising predicate *believe* and *Peter* is the object. *Peter* is also the subject of *to*, *be* and *drunk*. *Believe* is the sharer to infinitival *to*, auxiliary *be* and the adjective *drunk*.

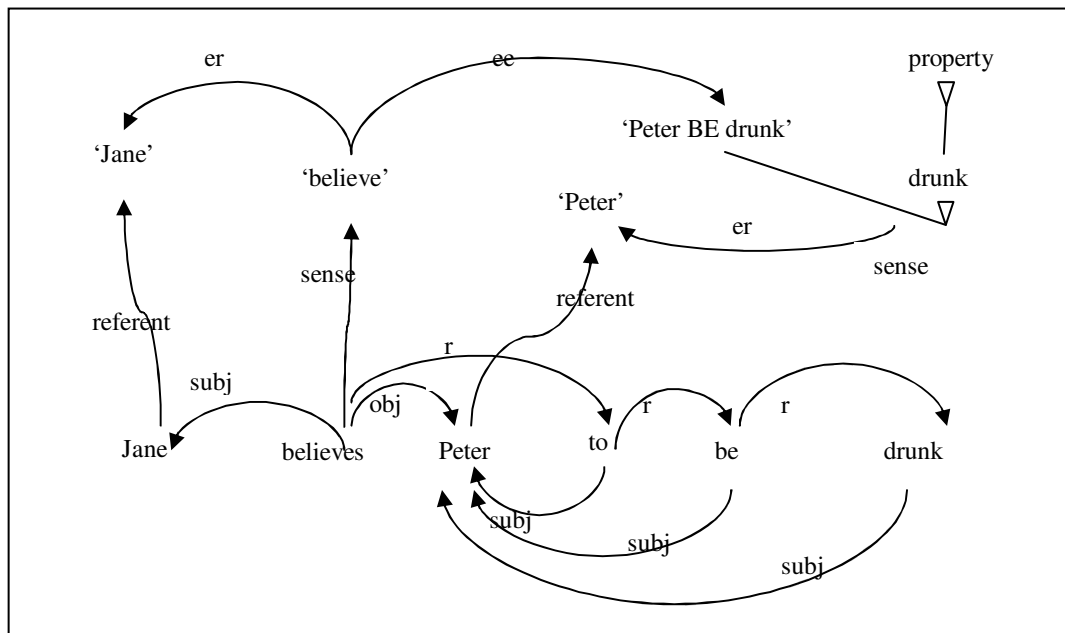


Figure 9: Raising to object

For semantic analysis, *Jane* is the ‘er’ of the verb of declare *believe*, which is a single event (Levin 1993: 182). *Believe* is associated with the relation *Peter BE drunk*; the relation is the ‘ee’ of *believe*. In the intrinsic structure of the relation, *Peter* is the ‘er’ of the adjectival *drunk*, which is labelled a property that *Peter* possesses. The relation is divided into the raised NP *Peter* and the catenative construction *to be drunk*. Since *Peter* possesses no roles or linkings directly from the verb *believe*, *believe* projects no constraint on raised NP *Peter* to show the transparency.

The mismatch between syntax and semantics is shown by the linking relations and by the relations which participants are associated with. Regarding the relations to the raising predicate, *believe* displays an object dependency on its object syntactically, whereas it displays an ‘ee’ dependency on the relation, not on a nominal argument. The analysis above shows the properties of raising construction:

- The syntactic properties of raising exhibits certain similarities. The first point is that in the WG model, raising does not involve movement²⁸. This observation is consistent with some other theories like LFG (Bresnan 1982) and Categorical Grammar (Jacobson 1990, 1992). Secondly, the raised NP is

a subject shared by the infinitival marker *to* and by the nonfinite verb. The syntactic distinction is the location of the raised NP: the selection of the two raising structures is determined by whether the raised NP is the subject or the object of the raising predicate, in addition to the property of a shared subject.

- Regarding the semantic properties, the first similarity is that the raising predicates associates with the relation, rather than the nominal argument. The second one is that the intrinsic structure of relation subsumes an NP and a verb; this NP is regarded as the ‘er’ of the event. In the realisation, this relation is divided into two parts: a single NP and a catenative construction. The distinction between two raisings is whether the relation is the ‘er’ of the raising predicate (raising-to-subject) or the ‘ee’ of the raising predicate (raising-to-object).
- The mismatch between syntax and semantics in raising is that the raised NP does not take an independent position in the semantic mapping, but it does for syntactic counterpart.

Regarding the difference between control and raising for the subject, a number of characteristics are noticed. Firstly, the syntactic analysis between subject control (Figure 3) and raising-to-subject (Figure 8) can be syntactically differentiated by the shared ‘r’ relation. In subject control, the matrix predicate is the sharer to the infinitival *to* and the infinitival *to* is a sharer to its nonfinite predicate. In raising-to-subject, the matrix predicate is simultaneously the sharer of the infinitival marker and the nonfinite predicate.

Three focal semantic differences exhibit in two structures. The first difference is that the subject control sentence is composed of two independent events and one independent controller, whilst the raising-to-subject sentence is composed of one independent event and one relation. The second difference is that the intrinsic structure of relation in raising-to-subject divided into two parts after realisation whereas no intrinsic change occurs in the structure of subject control.

The third one is that the only NP in subject control is the ‘er’ of the two events, whereas the only NP in raising-to-subject is the ‘er’ of the verb in the catenative construction. Therefore, the controlling nominal is directly associated with its events, whereas the raised nominal is only associated with its catenative construction, not the primary event.

Secondly, the object control (Figure 4) and raising-to-object (Figure 6) only show a paltry difference in the linking relation: *believe* is the sharer to the infinitival marker, aspectual verb, and the adjectival predicate, whereas *persuade* is the sharer to the infinitival and the non-finite verb.

On the semantic representation of object control and object raising, a number of crucial differences are displayed in terms of lexical semantics. The first difference is the components of the two structures. Object control consists of two independent nominal arguments and two events; object raising consists of one independent nominal argument, a single event, and a relation with a nominal, aspectual and adjectival argument.

The second difference is how the components interact with each other. For the object control, the control verb is associated with its ‘er’, ‘ee’ and the second event. For object raising, the raising verb is associated with the ‘er’ and the ‘ee’. In particular, the ‘ee’ of the raising verb is a relation. The third difference is the internal change of the relation in object raising. In the realisation, the internal structure of the relation is divided into two parts in object raising. Instead, the internal structure of the components does not dramatically change or separate.

3.4 The Distinction between Control and Raising

By presenting a parallel structure, this model is felicitous to capture the syntax-semantics mapping. This section discusses the raising/control distinction in terms of the WG model. A significant volume of literature is concerned with the two structures, in terms of various theories (Bresnan 1982; Radford 1997; Chomsky 1986, 1993, 1995; Hornstein 1999, 2003; Hudson 1984, 1990, 2005; Jacobson 1990, 1992; Pollard and Sag 1994; Langacker 1995; Taylor 2002; Rosenbaum 1967; Boeckx and Hornstein 2003). By the result we obtained above,

this parallel approach displays an explicit account of the raising/control distinction.

From the observation in 3.2 and 3.3, the semantic representation is more plausible to capture the minor distinction in the subtypes of control and raising. For instance, the difference between subject and object control cannot be distinguished syntactically because the syntactic distinction fails to accommodate the *promise*-type predicates (Culicover and Jackendoff 2001). This exception supports the earlier finding that control is a semantic distinction (Bresnan 1982; Hudson 1984, 1990, 2003, 2005; Landau 1999; Dalrymple 1999; Culicover and Jackendoff 2001).

The distinctions between control and raising are summarised below:

- The only syntactic distinction is the different linking relations of the sharer.
- A number of focal semantic distinctions are systematically shown in the network:
 - The first distinction is the interaction with different components. Control predicates are directly associated with its controller, whereas raising predicates are associated with a profiled relation, not the raised NP.
 - The second distinction is the constraint on the nominal argument. Control predicates projects constraints on its nominal arguments, whereas raising predicates projects no constraints on its raised NP.
 - The third distinction is the separation of internal structure of the relation. In raising, the relation is realised as two parts: the raised NP and the catenative construction. On the contrary, there is no structural separation in control.

A number of advantages account for raising/control by these semantic distinctions. The first advantage is that these distinctions account for why the

idiom chunks and dummies only occur in raising, not in control. The network exhibits the transparency that the raising predicates do not constrain its raised NP. In addition, the internal structure of the relation is dividable. Therefore, the NP of the fixed expression can appear in the position without constraint projection. Likewise, even the dummies can appear in this position.

The second advantage is that the semantic distinctions can accommodate the empirical difficulties, like *promise*-type predicates (see Figure 5-7). The syntactic representation cannot accommodate this data but the semantic one can be simply represented in terms of lexically-semantic analysis. This supports our assumption that the encoded meanings of the predicates affect the representation of their syntactic structures.

The third advantage is that they assist us to understand how the cognitive concepts work in our mental grammar from a cognitive perspective (Sakai 2005). For instance, in the abstract structure like raising, the raising predicate is associated with the relation to denotes probability, property, expectation, etc (Langacker 1995). Another instance is that the transparency is found in raising predicates, not in control predicates.

The final advantage is that these distinctions provide a lexico-semantic explanation for raising/control in the WG model. As aforementioned, the object control can be distinguished from subject control by whether the agonist is the ‘er’ of the catenative construction. These distinctions are not a list of controllers but a plausible treatment in order to explore the distribution and interpretation of the controlled elements.

In summary, a parallel model is composed of Dependency Grammar, Lexical Semantics, and Cognitive Grammar. To support a parallel model, the first reason is that a pure syntactic/semantic analysis is not sufficient to account for raising/control distinction. The second reason is that this model is assumed to present the mismatch between syntax and semantics in raising/control. The third reason is that this model captures as much empirical data as possible. After

explaining the major parameter settings, the WG model of control and raising were shown in the sections (see 3.2, 3.3).

The mismatch between syntax and semantics are explicitly displayed in the diagram: the mismatch only shows in raising, not in control. Then, we further compared different control and raising structures. The final section presents the syntactic and semantic properties in the raising/control distinction. On the basis of the WG model, control and raising exhibits a number of focal properties in lexical semantics and cognitive grammar. These semantic distinctions account for the raising/control distinction in four aspects: the idiom chunks and dummies, the treatment of *promise*, cognitive concepts, and a mature lexico-semantic treatment.

4 Treatment of the Empirical Data

From the result of the raising/control analysis (3.1, 3.2), the focus of this chapter will be on the semantic distinctions, although in syntax, there remain some paltry differences. By attesting the empirical difficulties (1.2) in the WG models, it is easy to explore the type of the construction and the lexical properties of the predicates.

The first solution of the lexical ambiguity in *begin*-type predicates is displayed in Figure 10 and 11, which show that *begin* can associate with a participant or a profiled relation. This follows two distinct constructions: subject raising in Figure 10 and subject control in Figure 11.

The second solution is the *want*-type predicates in Figure 12-15. This special type can associate with a participant, a profiled relation, and a path linking. The different models lead to the model of subject control, object raising, and R-nonobligatory control. In particular, the verb *want* encoded the meaning of ‘longing’. The selection of the ‘er’ of ‘longing’ determines whether it is an OC or NOC and favours the data separation that OC and raising can be unified.

4.1 The Treatment of Begin-type Predicate

By using the raising/control model in Chapter Three, the solution to the ambiguity of *begin*-type verbs is shown as below. Since we favour the semantic distinctions between control and raising, the following explanation will highlight the semantic construal. In Figure 10, *the street sweeper* denotes a machine which can clean the street after being functioned. The subject raising model shows *begin* is associated with the profile relation, which is the ‘er’ of the verb.

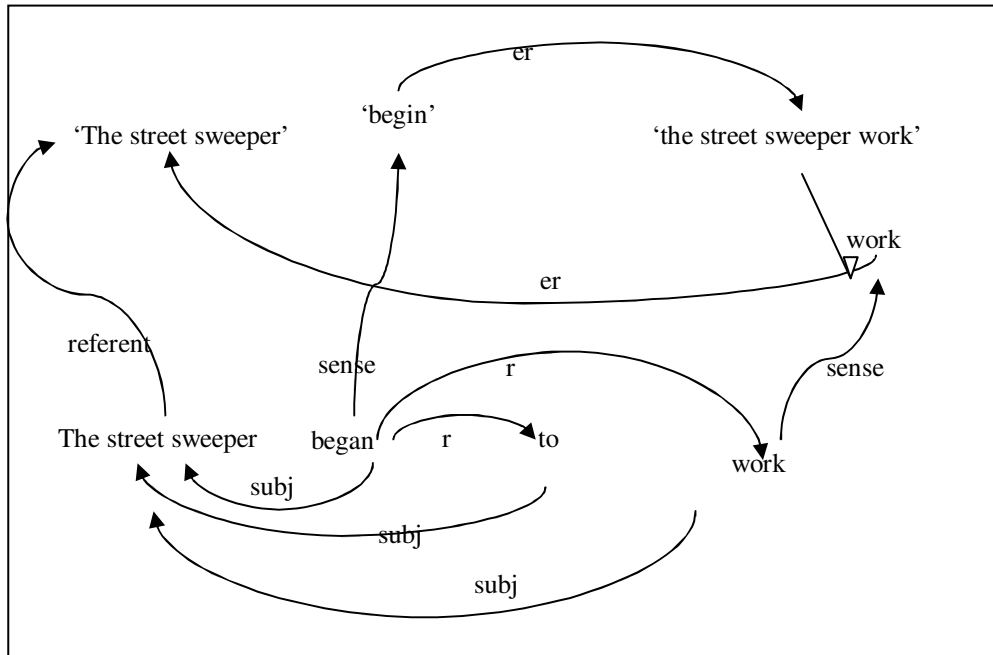


Figure 10: The street sweeper began to work—subject raising

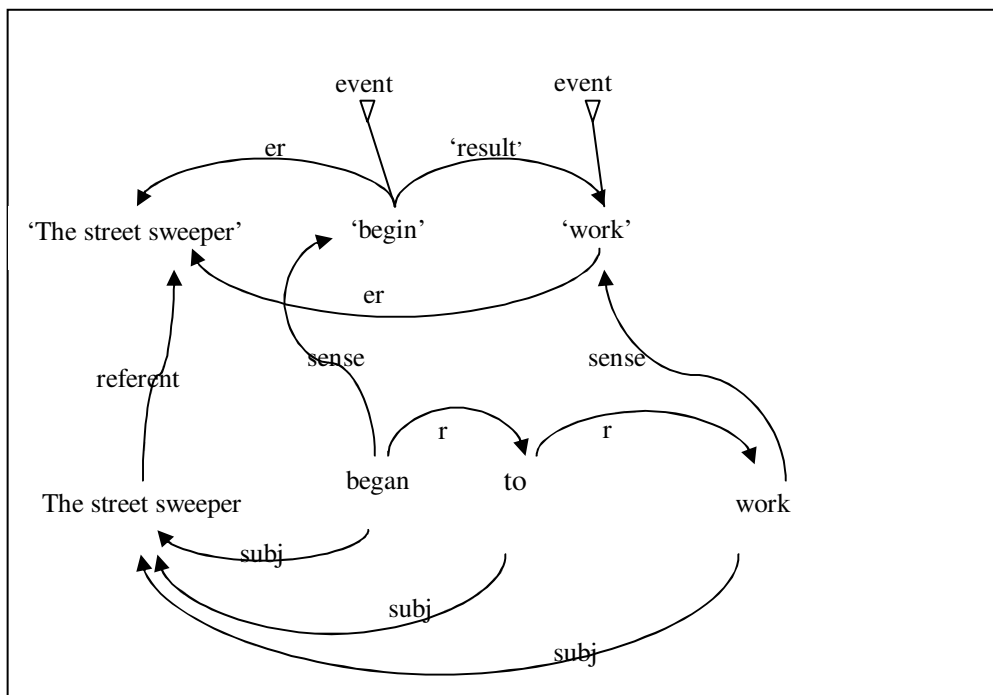


Figure 11: The street sweeper began to work—subject control

The street sweeper in Figure 11 denotes a person whose work is street cleaning. This structure is accommodated in the model of subject control; the sweeper is the shared ‘ers’ by the first event and the second event. Their syntactic representation only the different linkings between the nodes; Figure 10 is shared by the matrix predicate, whereas in Figure 11, the matrix predicate *begin* is a sharer to the infinitival *to* and *to* is the sharer to the nonfinite predicate *work*.

Figure 10 and 11 support that this distinction can be detected in the lexico-semantic relation. *Begin*-type verbs can associate with a catenative event directly or with a profiled relation. Figure 10 implies the action carried out by the beginner; Figure 11 implies a proposition denoted by the verbs (Asudeh 2002).

4.2 The Treatment of Want-type Predicate

Want-type²⁹ predicates are proposed as the third class of control and raising predicates (Davies and Dubinsky 2004: 14). The structure in (13a) is construed in the model of raising to object (Figure 12). The matrix predicate *want* associates with its profiled relation and this relation is the ‘ee’ of *want*.

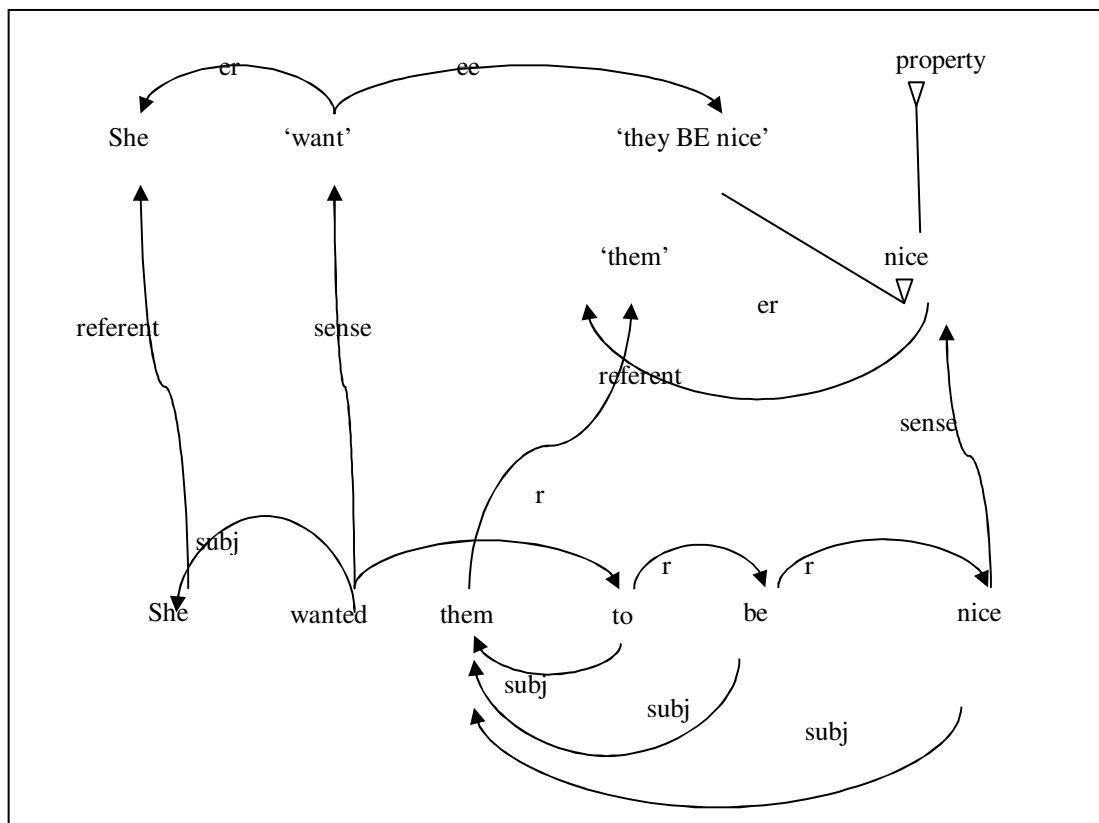


Figure 12: She wanted them to be nice—object raising

²⁹*Want* is classified as verb of desire (Levin 1995: 194).

Want-type predicates can be construed in subject control model (Figure 13). *She* is the ‘ers’ of *want* and *nice*. The two structures between Figure 12 and 13 propose that *want* is polysemous; it denotes a desired meaning to its profiled relation (Figure 12) and a desired meaning to another event which is performed by the desirer (Figure 13).

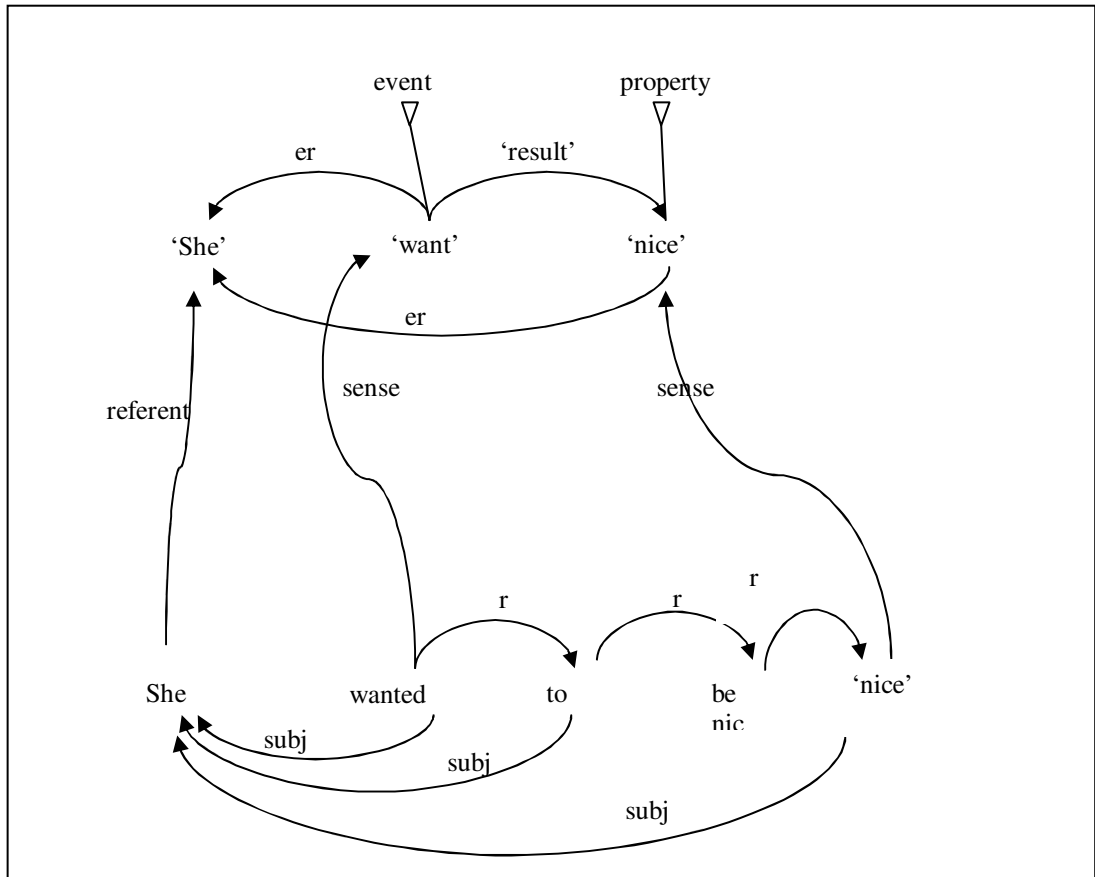


Figure 13: She wanted to be nice—subject control

Regarding the proposal of the verb of desire *want*, Figure 14 is expected in the model of object raising. The matrix predicate *want* denotes a meaning of desire to its profile relation as the ‘ee’ of *want*. The intrinsic relation can be divided into two parts in realisation: the expletive NP and its catenative construction.

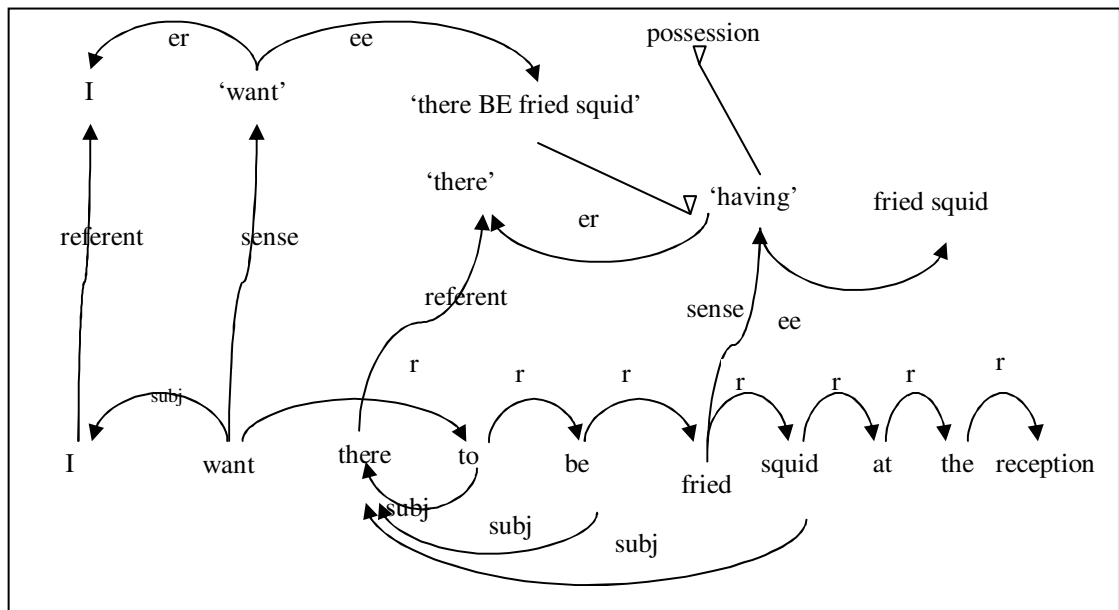


Figure 14: I want there to be fried squid at the reception

Figure 15 displays an object raising model. The idiomatic NP *the fur* is separated from its adjacent constituent. Thus, *want*-type verbs can appear in an object raising model and preserve the idiomatic expression.

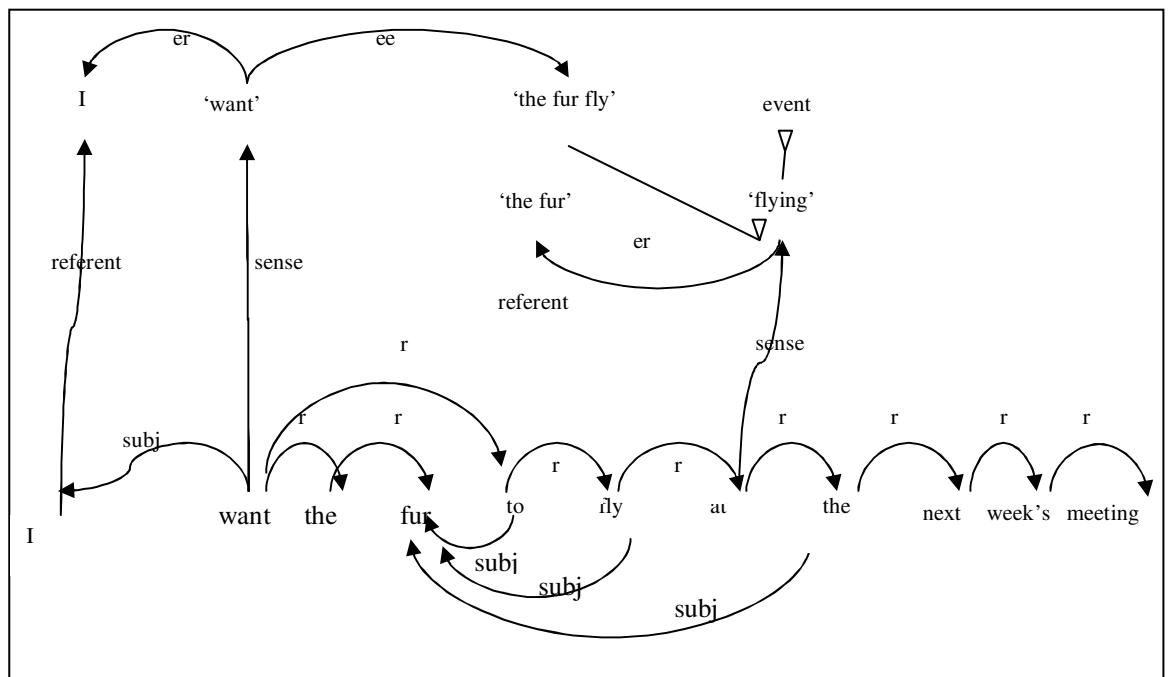


Figure 15: I want the fur to fly at the next week's meeting

The structure in (21a) is identified as R-nonobligatory control; the matrix predicate *want* licenses an InfC as its complement (Culicover and Jackendoff 2001). I addresses the encoded meaning of *want*: *want* denotes a 'longing' meaning to the participants, or to the profiled relation. In Figure 16, the

possessor of the longing is *She* and it is also the ‘er’ of *want*. This ‘longing’ event brings about the second event ‘nice’. The rest exemplifications shows that the ‘er’ of the longing is also the ‘er’ of *want* and that *want* is associated with the profiled relation in the raising mechanism. The contrual below exhibits a distinction from Figure 12-15: the ‘er’ of the ‘longing’ is not the wanter.

Alternatively, this ‘longing’ event denotes a path linking to the preposition *for* and a result linking to the second event *arrive*. The ‘er’ of the second event is *Ashley*, not the wanter or the ‘er’ or the separate NP. It implicates that the longing event denotes a possible ‘er’ *Ashley*, who is led by the preposition *for*. The path linking denotes the uncertainty of whether *Ashley* is the ‘er’ of the longing denoted by *want* and of whether *Ashley* performs the second event.

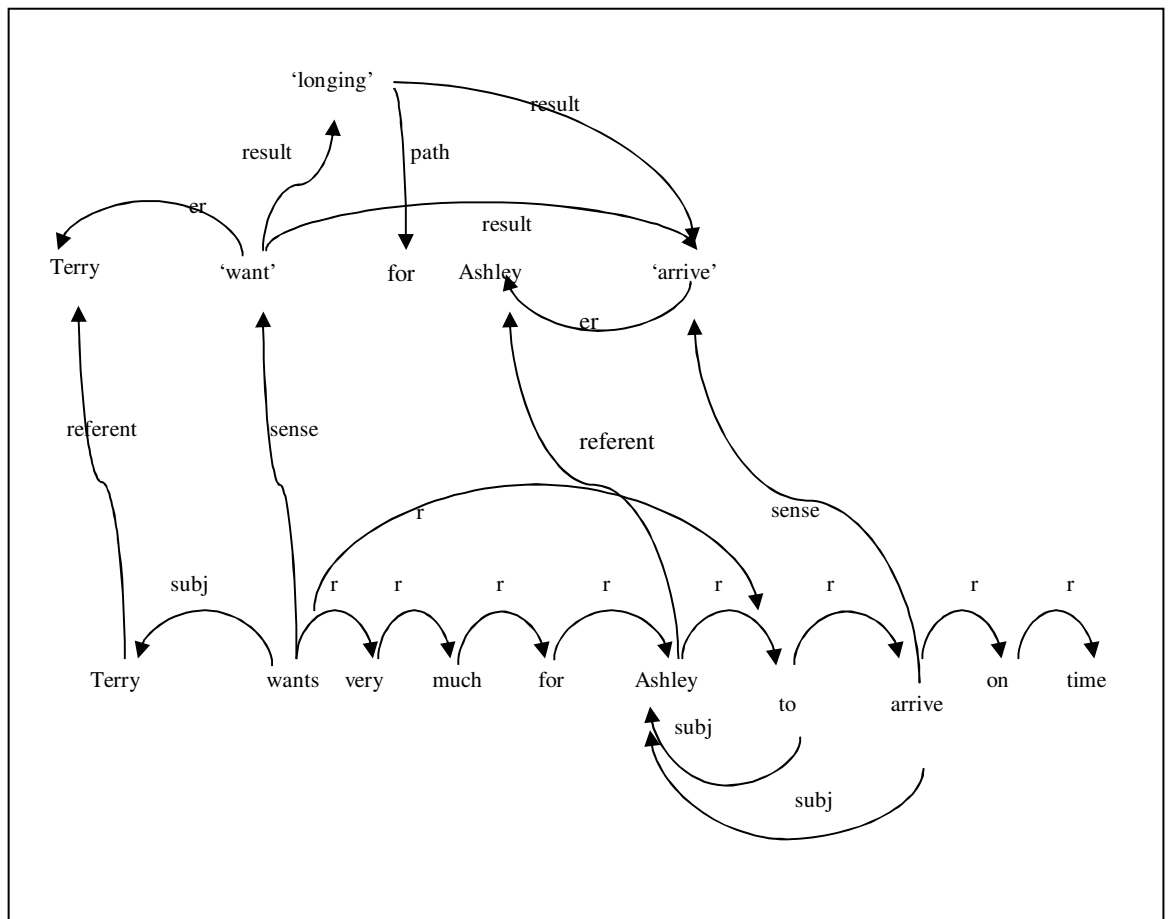


Figure 16: Terry wants very much for Ashley to arrive on time

Three properties of *want*-type predicates are found as below:

- There is no NP as a ‘wantee’ in the network representation; *want* is associated with an event, a profiled relation, or a path led by the preposition.
- In OC or in raising, the ‘er’ of the longing is the wanter, whereas in R-nonobligatory control, there is only a possible possessor as a complement of the prepositional phrase. This prepositional phrase denotes an uncertainty about the ‘er’ of the longing and about the performance of the second event.
- By the structures that *want* associates with, it can appear in subject control, object raising, and R-nonobligatory control.

The three properties explain the lexical interpretation of *want*-type predicates and the constructions it associates with. By being attested in different models, the WG model is felicitous to detect the type of the construction and show its lexical idiosyncrasy.

In sum, this chapter applies the WG model to the solution of empirical issues. From the lexico-semantic distinctions, it favours the assumption that the behavior of verb is encoded in its lexical entry and that these encoded meanings affect their syntactic representations. These models we established in Chapter Three can accommodate these empirical difficulties. The solution of *begin*-type verbs (Figure 10 and 11) shows its idiosyncrasy: *begin*-type verbs can associate with a catenative event in subject control model and can associate with a relation in subject raising model. As for *want*-type verbs, it can be accommodated in the model of object raising (Figure 12), subject control (Figure 13-15), and even R-nonobligatory control (Figure 16). These contruals unpack the polysemy of the *want*-type verbs. By resolving the empirical issues, we further verify the validity of WG model as a solution for raising/control distinction.

5 Conclusion

This dissertation presents a Word Grammar model to account for raising/control distinction. It firstly introduced the empirical differences between raising and control. It drew the attention to the treatment of OC: the traditional issues under

GB framework and some new problems in Null Case theory. Due to these issues, an elaborate treatment was proposed to resolve OC. Next, it presented the theoretical comparison between a syntactocentric approach and a parallel treatment. The comparison suggested a parallel approach for OC in order to see the type of the distinction and to understand how semantics affect syntax. In order to support the usage of a parallel analysis, this research proposed a WG model in terms of Dependency Grammar, Lexical Semantics and Cognitive Grammar. The reason to employ this parallel approach was to present the issues at the type of the distinctions and the mismatches in control and raising. The network representations in control and raising favoured three assumptions in importance after a series of examinations, as listed below:

- Firstly, the network model shows that control and raising predicates can be distinguished by their lexico-semantic properties and by cognitive concepts. Control predicates are directly associated with their controllers and projects constraints on the controllers (see 3.2.2); raising predicates are associated with their profiled relation, not the raised NP (see 3.3.2).
- Secondly, this WG model satisfies the request of a mature semantic analysis. For instance, the empirical difficulty of *promise* is resolved by a semantic explanation (see 3.2.2).
- Thirdly, the network representations in control support the objection against the existence of PRO formative in English.

The extended work displays in Figure 11-16 in order to resolve the empirical difficulties in 1.2. We find their idiosyncrasies which are encoded in the lexical verb. These idiosyncrasies reflect their syntactic structure but not vice versa (cf. see 4.1). The results of the network answer the theoretical questions at the beginning of the Chapter Two. Raising/Control distinctions are semantic and the parallel representation in raising rejects the isomorphism between syntax and semantics. The latter supports the concept that the mapping between syntax and semantics is not one-to-one: the syntactic distinction does not mirror the semantic distinction (Hudson 2003). A WG model is thus derived due to this concept.

More future work should be done in the following directions. One direction is to extend this network to complicated data, such as adjunct control, SOR (subject-raising-to-object) and H-nonobligatory control. These complicated data are great challenges to WG model in order to see if it can capture the distinctions, accommodate the data and construct its own model. Due to the limited space, these structures are not attested. The other one is to apply the network crosslinguistically, particularly to some languages distinct from English³⁰. This is to see the flexibility of the network model for the purpose of having a generalization for control and raising structures. Since control and raising phenomena varies in each language (Hudson 2003), a heuristic device is required to capture the differences and to explore possible generalisations.

The network representation gives a more thorough explanation of raising/control distinction. From its simplicity, we can capture both syntactic and semantic information of various structures through a couple of arrows and nodes. From its flexibility, WG model embraces a number of parameters and provides a parallel representation without conflicts. The examination thus needs to extend to various empirical data in order to verify the validity of WG model in the treatment of raising and control or of other significant phenomena.

³⁰ Hudson (2003) applied the raising/control distinction in terms of WG model to Icelandic, Ancient Greek and Russian, but we are glad to see more languages under examination in order to improve the WG model.

6 Bibliography

- Asudeh, Ash. (2002). *A Resource-Sensitive Semantics for Equi and Raising*. David Beaver, Stefan Kaufmann, Brady Clark and Luis D. Casillas Martnez, eds. *The Construction of Meaning*. CSLI.
- Bharati, A., Vineet Chaitanya, et al. (1995). *Natural Language Processing. A Paninian Perspective*. New Delhi, Prentice-Hall of India Private Ltd.
- Boeckx, C. and N. Hornstein (2003). "Remarks and Replies-Reply to 'Control is not Movement'." *Linguistic Inquiry* **34**(2): 269-280.
- Bresnan, J. (1982). "Control and Complementation". in *The Mental Representation of Grammatical Relations*. J. Bresnan. Mass., The MIT press. **Ch. 5**: 282-390.
- Cattell, R. (1984). *Composite Predicates in English*. New York, Academic Press.
- Chierchia, G. (1988). "Structured Meanings, Thematic roles, and Control." *Properties, Types, and Meaning 2: Semantic Issues*, ed. Gennaro chierchia, Barbara Partee, and Raymond Turner, 131-166. Dordrecht: Kluwer.
- Chomsky, C. (1969). *The Acquisition of Syntax in Children from 5 to 10*. Cambridge, MA: MIT Press.
- Chomsky, N. (1965). *Aspects of the Theory of Syntax*. Cambridge, MA: MIT Press.
- Chomsky, N. (1972). *Studies on Semantics in Generative Grammar*. The Hague, Mouton.
- Chomsky, N. (1986). *Lectures on Government and Binding*. Foris, Dordrecht.
- Chomsky, N. (1995). *The Minimalist Program*. Cambridge, Mass., MIT Press.

- Chomsky, N. and H. Lasnik (1993). "The Theory of Principles and Parameters".
In *Syntax: An International Handbook of Contemporary Research*.
Joachim Jacobs, Arnim von Stechow, Wolfgang Sternefeld and a. T.
Vennemann. Berlin, Walter de Gruyter. [Also published in Noam
Chomsky, *The Minimalist Program*, 13-127. Cambridge, Mass.: MIT
Press (1995)]: 506-569.
- Covington, M. (1984). *Syntactic Theory in the high middle ages*. Cambridge :
Cambridge University Press.
- Croft, W. (1990) 'Possible verbs and the structure of events'.in *Tsohatzidis*
(1990). 48-73.
- Croft, W. and D. A. Cruse (2004). *Cognitive Linguistics*. Cambridge, Cambridge
University Press.
- Culicover, P. W. and R. Jackendoff (1995). "Something Else for the Binding
Theory." *Language Inquiry* **26**: 195-217.
- Culicover, P. W. (1997). *Principles and Parameters: An Introduction to*
Syntactic Theory. New York, OUP.
- Culicover, P. W. and R. Jackendoff (2001). "Remarks and Replies: Control Is
Not Movement." *Linguistic Inquiry* **32**(3): 493-512.
- Dalrymple, M. (1999). *Semantics and Syntax in Lexical Functional Grammar:*
The Resource Logic Approach. Cambridge, MA, MIT Press.
- Davies, W. and S. Dubinsky (2004). *The Grammar of Raising and Control: A*
Course in Syntactic Argumentation. Australia, Blackwell.

- Debusmann, R. (2006). *Extensible Dependency Grammar: A Modular Grammar Formalism Based On Multigraph Description*, Saarland University. **PhD Thesis**.
- Farkas, D. (1988). "On Obligatory Control." *Linguistics and Philosophy* **11**: 27-58.
- Gisborne, N. (1996) English Preception Verbs, The University of Edinburgh. **PhD Thesis**
- Gisborne, N. (2006). *Lexical Semantics*. Lecture in Honour Course on English Language Programme. Department of Linguistics and English Language, The University of Edinburgh.
- Haegeman, L. (1994). *Introduction to Government and Binding Theory*. Oxford, Blackwell.
- Holmes, W. J. (2005). Lexical properties of English verbs, University College London. **PhD Thesis**.
- Hornstein, N. (1999). "Movement and Control." *Linguistic Inquiry* **30**(1): 69-96.
- Hornstein, N. (2003). On Control. *Minimalist Syntax*. R. Hendirick. Oxford, Blackwell: 6-81.
- Hudson, R. A. (1984). *Word Grammar*. Oxford, Blackwell.
- Hudson, R. A. (1990). *English Word Grammar*. Oxford, Blackwell.
- Hudson, R. A. (1999). *Encyclopaedia of English Grammar and Word Grammar*. Available. <http://www.phon.ucl.ac.uk/home/dick/papers.htm>
- Hudson, R. A. (2003). "Case-agreement, PRO and Structure Sharing." *Research in Language* **1**: 7-33.

- Hudson, R. A. (2005). *Networks: Advances in Word Grammar*.
Available. <http://www.phon.ucl.ac.uk/home/dick/papers.htm>
- Jackendoff, R. (1972). *Semantic Interpretation in Generative Grammar*.
Cambridge, Mass, MIT Press.
- Jackendoff, R. (1974). "A Deep Structure Projection Rule." *Linguistic Inquiry* **5**:
481-506.
- Jacobson, P. (1990) "Raising as Function composition" *Linguistics and
Philosophy* **13**: 423-475.
- Jacobson, P. (1992) "Raising without Movement" in Larson, Richard K., Sabine
Iatridou, Utpal Lahiri and James Higginbotham (eds.) *Control and
Grammar* : 149-194. Dordrecht: Kluwer Academic Publishers.
- Jaeggli, O. (1980). "Remarks on *to* contraction." *Linguistic Inquiry* **11**: 239-245.
- Lakoff, G. (1971). *Irregularity in Syntax*. New York, Holt, Rinehart and
Winston.
- Landau, I. (1999). Elements of Control. Cambridge, MIT. **PhD Thesis**.
- Landau, I. (2003). "Movement is out of Control." *Linguistic Inquiry* **34**: 471-98.
- Levin, B. (1993) *English Verb Classes and Alternations: A Preliminary
Investigation*. University of Chicago Press: Chicago
- Lightfoot, D. (1976). "The Theoretical Implications of Subject Raising."
Foundation of Language **14**: 257-86.
- Owens, J. (1988). *The Foundations of Grammar: an Introduction to Mediaeval
Arabic Grammatical Theory*. Amsterdam, Benjamins.

- Percival, K. (1990). "Reflections on the History of Dependency Notions in Linguistics." *Historiographia Linguistica* **17**: 29-47.
- Perlmutter, D. M. (1970). The Two Verbs 'begin'. *Reading in Transformational Grammar*. ed. Roderick Jacobs and Peter Rosenbaum. Waltham, MA: Ginn: 107-19
- Perlmutter, D. M. (1971). *Deep and Surface Structure Constraints in Syntax*. New York, Holt, Rinehart and Winston
- Pollard, C. and I. Sag (1994). *Head-Driven Phrase Structure Grammar*. Chicago, University of Chicago Press.
- Radford, A. (1997). *Syntactic Theory and the Structure of English: A Minimalist Approach*. Cambridge, Cambridge University Press.
- Rosenbaum, Peter S. (1967). *The Grammar of English Predicate Complement constructions*. Cambridge, Mass.: MIT Press.
- Ruwet, N. (1983). Montee et controle: Une question a revoir? *Analyses grammaticales du francais: Erudes publiees a l'occasion du 50e anniversaire de Carl Vikner. Revue romane*. **24**: 17-34 [English translation in Nicolas Ruwet, *Syntax and Human Experience*. Chicago: University of Chicago Press].
- Ruwet, N. (1984). "De la distribution des complements a temps fini et des complements a l'infinitif en francais." *Cahiers de grammaire (Toulouse-leMirail)* **7**: 74-138. [English Translation in Nicolas Ruwet, *Syntax and Human Experience*. Chicago: University of Chicago Press].
- Ruwet, N. (1991). *Syntax and Human Experience*. Chicago, University of Chicago Press.
- Sag, I. and C. Pollard (1991). "An Integrated Theory of Complement Control." *Language* **67**: 63-113.

Santorini, B. and A. Kroch. (2000). "*The Syntax of Natural Language: An Online Introduction Using the Trees Program.*"

Available from <http://www.ling.upenn.edu/~beatrice/syntax-textbook/>.

Sakai, K. L. (2005). "Language Acquisition and Brain Development." *Science* **310**: 815-19

Simpson, J. (2006). Oxford English Dictionary Website, Oxford University Press. Available. from <http://www.oed.com>

Talmy, L. (1985) 'Force Dynamics in Language and Thought'. Papers from *the Parasession on Causatives and Agentivity*. Chicago: Chicago Linguistic Society.

Taylor, John R. (2002). *Cognitive Grammar*. Oxford: OUP.

Williams, E. (1980). "Predication." *Linguistic Inquiry* **11**: 203-38.